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School Buildings in Canada - a Survey, June 1972. 1
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SCHOOL ILDINGS IN CANADA

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A SURVEY:

- LEGISLATIVE BASES
- GOVERNMENT SUPPORT
- PROCEDURES
- NATURE AND SIZE OF FACILITIES
- RELOCATABLES AND RENOVATIONS
- FURNITURE AND EQUIPMENT
- COSTS
- COST CONTROLS AND COMMENTS
- COMMUNITY USE
- INNOVATIONS
- OBSERVATIONS AND RECOMMENDATIONS

Prepared for
THE ALBERTA DEPARTMENT OF EDUCATION

by

LYNN G. HALL
June, 1972

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FOREWORD

There have been recurring requests in Alberta for larger school facilities, expanded services, less regulation in procedures and more financial support. These demands aroused the interest of the Department of Education about statutory policies, required procedures, nature of facilities, and capital assistance in other provinces.

Consequently, the Director of School Administration was requested to prepare a comprehensive report on provisions for school accommodation throughout Canada. The study envisaged a survey of legislative bases for providing and financing buildings, the regulatory procedures involved, and the size and nature of facilities including relocatable structures or portable units. Attention was also intended concerning equipping, furnishing, or renovating the schools.

Departments of Education in all provinces were questioned concerning these matters and innovations relative to planning, construction procedures, and design. School districts, administrators, and professional firms were contacted as well. Principals of schools visited were also queried. Informative responses indicated the statutory requirements and widespread implementation of concepts regarding flexibility of space, community use of schools, and attention to new trends.

Thanks are expressed to the Deputy Ministers in every province for replies and arrangements for interviews with school planning officials of their Departments. Particular recognition for correspondence and discussions, is acknowledged as follows: to J. L. Cantry, I. Valen, and P. Biden in the British Columbia Department of Education and to A. J. Longmore and S. Dietz of the Victoria S.D. as well as to A. Patterson, D. Pritchard, and A. B. Wilson, Architect, in the Vancouver City Board Office; to Dr. S.N. Odynak, J. H. Blocksidge, and C. G. Jewers, of the Alberta Department of Education and for expressions of opinion from the Architects' and Construction Associations as well as from Facility Planners in the city systems; to C. Amundrud and C. Miles of the Department of Education in Saskatchewan and to J. Hofford, Superintendent of Education Facilities for the Regina Separate School District; to N. G. Harvey, B. M. Grafton, C. Brown, and their colleagues in the Manitoba Department of Education; to R. J. Lawton, S. T. Orlowski, Dr. Aboul-Khair, A. Blanthorn, K. Anderson, G. Arnott, and their associates in the Education Department of Ontario and to Peter Tirion and Dr. Murray of the Education Facilities Project; to Y. Martin and J. Plourde in the Quebec Education Department and to A. Couture and especially, Y. Maheu of the Engineering firm of Lalonde Valois, LeMarre, Valois, and Associates as well as to Robert Belisle, Director-General

for Chamblay Schools and A. Roy, Director-General of Protestant Schools in Quebec City; to G. R. Pierce of the Nova Scotia Department of Education and to Peter Mettam, of the Mettam Architectural firm in Halifax, as well as for expressed viewpoints from Superintendents A. Conrad of the Halifax City Schools, C. Perry of the Halifax County and G. J. McCarthy of the Royal Advisory Committee on Education; to G. W. Robinson, Director of School Planning and Superintendent George McIntyre of the Education Department in New Brunswick and also to G. McConagie, Assistant-Superintendent in Regional Districts as well as to A. McLeod, Superintendent of the Moncton City District, and his associates; to Lorne Moase and Harold Landry of the Education Department in Prince Edward Island and to G. Jenkins in the Department of Public Works; and to P. J. Hanley and Allan Guy of the Newfoundland Department of Education.

Gratitude is expressed for the sincere cooperation and time afforded by all these individuals in supplying the extensive information incorporated in this report. Thanks are extended for the expression of opinion from engineering and architectural firms and from some architects in public employment. Recognition is also accorded to respondents from Statistics Canada, the Federal Departments of Industry and of Regional Economics Expansion, the National Research Council of Canada, Stelco Corporation, Nordic Air Structures, and the School Education Facilities Project in Toronto.

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INTRODUCTION

Education is a provincial concern. Buildings have always been one of the acknowledged needs and local school jurisdictions in every province assume obligations to provide accommodation for the pupils. That varies according to the programs and priorities in each province. The expenditures for facilities, furnishings, and equipment have risen steadily in response to larger enrolments, program demands and society's expectations. Changing curriculum has emphasized educational technology, more library facilities, open area concepts or flexible team teaching centers, and expanded space and services for many special subjects. A review of conditions throughout the country should indicate interesting similarities and differences.

This study of the Canadian scene surveys the nature of facilities, the procedures for establishing them and the financing involved. It explores provisions for equipment, renovations, and relocatable units. It also notes innovative trends in processes and design, and the value of an interdisciplinary approach in planning.

The first chapter reviews the statutory bases concerning the obligations and conditions for building schools and for assistance from provincial funds. It also indicates the legislative authority for boards to borrow and outlines the legal provisions for approvals and financing. The next chapter describes the extent of capital aid in each province for buildings and equipment. It is followed by one on procecures for securing government approval of facilities and plans, local acceptance of borrowing, and tendering.

Chapter IV notes some provincial policies for recognition of needs and indicates in statements and charts comprehensive details about the sizes and nature of facilities for the programs of each province. The chapter concludes with comments about factors in approvals, utilization of facilities, comparisons, special features, and other related items. A further chapter summarizes policies for the provision and support for furniture and equipment. Temporary conditions, limited needs for more space, or transfer of facilities to other centers are noted in a chapter on relocatable units or portables. Attention is also given to support for approved renovations.

Three chapters focus attention on costs. Chapter VII outlines some prices, cost averages and ranges for schools of varying sizes and types throughout the country. A succeeding chapter briefly reviews the cost controls operating in each province. Chapter IX comments about costs and notes reasons for forecast

of rising prices, factors influencing increases, and possible effects of restrained costs on physical features. It also mentions implications of cost controls relative to financial assistance and local tax requisitions.

A short chapter indicates attitudes and practices about community use of schools and also views about financing additional facilities desired beyond those approved for school need.

Chapter XI provides an overview of some innovative trends manifested in proposals for flexibility, systems building and modular construction, project management, open area concepts, and other features of recent design. Need is expressed for leadership in comprehensive study of materials, procedures, and planning. It is suggested that all agencies involved might participate in an interrelated research-design approach.

A final chapter consists of a summary as well as some observations and recommendations. Further exploration of some would require attention beyond the time-limits of this study. The comments offered, however, may engender proposals for future consideration.

CHAPTER I

LEGISLATION FOR BUILDING AND FINANCING SCHOOLS

The authority for school operation derives from the statutes and regulations pursuant thereto. The establishment of accommodation is one of the necessary requirements of all school jurisdictions. Legislation in all provinces provides for the observance of this obligation, approval of proposed facilities, and for financial assistance for the capital expenditures. Further statutes and regulations stipulate the manner in which the financing shall be acknowledged and implemented. The following review of provincial legislation and regulations indicates the legal bases for the procedures to be followed.

BRITISH COLUMBIA

Statutes in British Columbia indicate a close relationship of capital financing to the total operational costs for all the predetermined instructional units[1] including the basic educational program, auxiliary services, and annual capital expenditures. The basic educational program is approved by the Minister pursuant to Section 180[2] and a basic grant in respect of this shall be the amount over the basic levy to meet the cost of that approved program. The board may assess an additional 10 per cent over that levy. The Minister may indicate an estimate of the basic levy as indicated by,

> Section 197. On or before the first day of December in each year, the Minister shall send to each Board a notice setting forth the amount of the cost of the basic education programme determined under section 180 for the school district for the following calendar year together with an estimate of the basic levy which will be determined for that year.

---

[1] Section 182. (2) The number of approved instructional units for each school district shall be calculated on the basis of not more than one unit for each thirty kindergarten and elementary pupils, or fraction thereof, enrolled in each school in the district, and not more than one unit for each twenty secondary and Grade XIII pupils or fraction thereof, enrolled in each school in the district, as certified under this section.

[2] Section 180. (1) The Minister of Finance shall pay in each calendar year to the Board of each school district a basic grant for that year, which shall be the difference between the amount of the cost of the basic education programme for that school district, as finally approved by the Minister of Education, and the amount which can be raised in that school district by a basic levy. (The annual basic levy such as 26 mills is determined by the government which pays the difference between what that raises and what is needed on an equalized basis.) (6) The Board of each school district shall assume as its obligation the amount by which the total budget of the school district for operating expenses exceeds the sum of the basic grant and the supplementary grant (if any) calculated under this section. 1958, c. 42, s. 180; 1968, c.45, s. 24.

This amount shall be indicated in the board's budget which must be reviewed by the Department[1] before constituent districts may be requisitioned. This is apart from the decision of any board to seek additional funds through majority consent of the municipalities or by submitting an appropriate bylaw.

The budget includes the amount of annual payment for capital borrowings and the Department may determine what expenditures are capital or operating expenses. The approved share of the capital costs are to be reimbursed pursuant to Section 183[2] by conditioned grants in respect of all payments of principal and interest less those expenditures specified as ineligible for capital grants. The Act specifies that the amount of the capital grant shall vary according to the necessary mill rate imposed on the different assessments involved.[3]

Capital expenses, as specifically defined in the Act[4], include expenditures for acquiring and developing sites, for "purchasing, constructing, reconstructing, making major alterations to, furnishing and equipping buildings for school purposes", and for contingent and other expenses necessarily incurred which are of a capital nature.

Capital expenditure is controlled. The Act stipulates that:

> Section 190. (1) No capital expenditures shall be made by a Board without the prior approval of the Minister, who, at his discretion and upon consideration of such capital expenditures being necessary and essential, may approve or disapprove in whole or in part of the proposed capital expenditures.
>
> (2) In respect of approved capital expenditures, the Minister shall specify (a) the amount of the capital expenditures which are eligible for capital grant payments under this Act; and (b) the amount of the capital expenditures which are not eligible for capital grant payments under this Act.

---

1. Section 197. (5) The Minister shall cause the annual budget to be reviewed by officials of the Department in consultation, where necessary and practicable, with the Board, and the Board may alter the allocation of expenses within sections of the budget or may reduce the budget as a result of the review.

2. Section 183. (1) The Minister of Finance shall pay in each calendar year to the Board of each school district a capital grant for that year which shall be computed in this matter:-
   The subsections specify what budgetary capital payments for principal and interest may be approved, and to establish the grant amount, their sum may be reduced by the approved expenditures not eligible for grants.

3. Section 183(b) -The Public Schools Act; quoted in the section on support.

4. Section 2 -The Public Schools Act.

A board may not include a capital item for shareable costs without prior approval. However, Section 195(b)(1) authorizes a board to include an extra amount in the budget for approved non-shareable capital expenses that are specified as not eligible for support. This may pertain, for example, to more new equipment or replacement or to library books or some particular building item.

Extra area for an approved site requires local payment if there is approval for including the cost in the budget. However, a referendum for raising the money locally must be favorable and government approval (Section 190) will then be needed for spending it. A board may not requisition for more than the capital needs shown in the annual budget other than for some special project to be paid for within the year.

The Minister may require that the annual statement show "that portion of the school mill rate which is the basic levy . . . , that portion . . . which is the levy for the operating expenses of the Board which are in excess of those expenses toward which Provincial grants apply, and that portion of the school mill rate which is the levy for capital expenditures or capital debt expenses . . .[1]

Discussions are held with boards early in the year to determine building and financial needs. Unused funds from previous referendums may be used as well as any surpluses arising from economies on earlier projects or variations that have resulted from changing purposes; any excess of emergency capital grant may also be applied. Extra funds for a desired project may then be sought through referendum for borrowing.

Having secured approval for school construction a board may pass a bylaw for borrowing money for capital expenses as approved by the Minister.[2]

---

1. Section 200(3) -The Public Schools Act.

2. Section 214 -The Public Schools Act

   Referendums may be of two types - one for shareable costs and another for non-shareable expenditures; sometimes there are no funds for the latter or the project such as a swimming pool may not be approved.

Before a plebiscite is requested the board requires approval of the bylaw by the Lieutenant-Governor. All bylaws for debenture borrowing must be presented in a plebiscite (Section 216) to the owner-electors having Canadian citizenship. A 60 per cent majority is required for its acceptance. Any exception to requirement for a plebiscite would apply where a sudden influx of population or other emergency warranted ministerial approval of capital borrowing by debenture or a five-year loan.[1]

After a favorable plebiscite the board may formally adopt the bylaw and register it with the Department of Education. Thirty days may elapse for any protest proceedings. The board must then have a certificate of approval signed by the Minister.[2] A bylaw may remain in force for two years within which time it is expected that debenture funds will be provided.

Interim financing is arranged by controlled bank loans, until such time as a significant level of borrowing has been reached whereupon debentures may then be sold.[3] Debentures for shareable costs issued by a board are sold to the British Columbia School District Capital Financing Authority according to accepted conditions.

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1. Section 217 -The Public Schools Act.
2. Section 223 -The Public Schools Act.
3. Section 212 -The Public Schools Act.

ALBERTA

School construction and financing is subject to The School Buildings Board Act, The School Act, and the Local Authorities Act as well as the Regulations pursuant to them. The first one provides for the establishment of a School Buildings Board to consider requests of school boards for buildings for which financial support is expected. Section 4 of the Act specifies that,

> A school division shall apply to the board (School Buildings Board) for approval of any school building project the cost of which is to be paid for in whole or in part from funds available for capital purposes, including the retirement of capital borrowing under the School Foundation Program Fund regulations.

The Act further states that,

> Section 5. (1) The lieutenant Governor in Council may make regulations to govern the board in granting approval of a school building project including the preparation and development of the site, the service connections, a water system, sewage disposal and the furniture and fixtures relative to the project.
>
> (2) The regulations may include a schedule setting forth with respect to school buildings of different sizes and for different purposes the limits in respect of which approval may be granted.
>
> (3) Any project, or any portion of a project, not approved by the board as coming within the scope of the regulations shall not be a charge against the School Foundation Program Fund as described in subsection (1) of section 4..

The Regulations (Section 22) pursuant to the School Buildings Act asserts that the Buildings Board

> may rule on the plans of new projects or require their replanning and in such cases make such adjustments to the recognition of need . . . as it deems necessary to carry out its requirements.

The School Act, 1970, stipulates that:

> Section 94 No financial aid from Provincial Government funds shall be given to a board for construction of a school building or alteration, addition or renovation of a school building without the prior approval of the School Buildings Board pursuant to the School Buildings Act and regulations thereunder.

The Act further provides that tenders for construction and change orders must be approved as specified in

> Section 98 (3) All specialties, bills, notes or accounts stated, given or made, in whole or in part, for or to secure any price or materials in connection with a contract for the construction or purchase of a school building to be used for the instruction or accommodation of pupils are void, unless all of the terms of the contract given or made conform to the tender and change orders approved by the Minister or person designated in writing by him.

Where government support is expected, prior approval by the Department is required of the plans and specifications for proposed projects except in special cases. The statute states:

> Section 95(1) No school building to be used for the instruction or accommodation of pupils or an addition to such a school building or a structural alteration intended to be built or made where the funds are to be supplied either wholly or partly by the Government may be erected unless the plans and specifications for it have received the prior approval of the Minister or a person designated in writing by him to give approval.

But subsection (2) of this section states that:

> Notwithstanding subsection (1) the approval of the Minister is not required in respect of a board which has over 15,000 pupils enrolled in its schools.

Thus some plans do not need final approval and examination of them is significant only for establishing the extent of financial support.

A Board constituted under The Local Authorities Board Act considers for approval the requests of school boards to borrow funds for capital construction. The School Foundation Program Regulations pursuant to The School Act indicate that debts incurred for buildings shall be serviced annually from the Fund according to the amount approved for support.

Although short-term loans may suffice for small projects the major part of financing of capital construction is usually by debenture borrowing. If an appropriate bylaw is accepted by the electors and approved by the Local Authorities Board the school board may then seek debenture funds for costs of the approved area from the Municipal Finance Corporation after the building contract is signed. The annual repayment of borrowings is reimbursed each year up to the amount of the applicable support as payment of unsupported debentures for excess costs must be paid locally as would costs for unapproved area for which debenture funds are not issued.

Section 27 The Local Authorities Board Act, 1961
Section 13 School Foundation Program Fund Regulations, 1971

The School Act of Saskatchewan specifies that,

Section 3 The Minister, with the approval of the Lieutenant-Governor in-Council may:

1. make regulations of the department:

    (b) for the location, specifications, financing, furnishing and care of school buildings and the arrangement of school premises;

The Act further stipulates that,

Section 118 It shall be the duty of the board of every district and it shall have power:

(8) to purchase or rent school sites or premises, and to build, repair, furnish and keep in order the school house, furniture, fences and all other school property;

and that,

Section 147 (1) The board of a district may borrow money on the security of the district for:

(b) acquiring, erecting, repairing, furnishing, equipping, moving or adding to a school building. (or teacher's or janitor's house or a building to be used for purposes of school administration;)

Administrations operating in large school units[1] or under the Secondary Education Act[2] have similar powers. A school board applies to The Local Government Board for authorization of a loan specified by resolution.[3] If the Government Board approved it notifies the school board and publishes a notice of the authorization in the Gazette.[4]

The board shall then pass a by-law within 30 days according to the terms of the authorization and may submit it to the ratepayers according to the following enactment:

> 151. The board, within thirty days of the date of the notification that the loan has been authorized by The Local Government Board, shall pass a by-law on the terms and in the form prescribed by that Board or to the like effect, and shall, where required to do so by The Local Government Board, submit the same to a vote of the ratepayers in the manner provided in this Act.

---

[1] Section 116 - The Larger School Units Act.

[2] Under the Secondary Education Act a Board of Education may be established which may assume the obligations formerly incurred by constituent districts for debenture borrowing.

[3] Section 149 (2) The Local Government Board may permit a board to secure a debt incurred under section 147 by a promissory note, debenture or other form of security in favour of any person, institution or corporation and may set the maximum rate of interest payable and the period within which such debt shall be paid.

[4] Section 150 - The Schools Act
Section 119 - The Larger Units Act

Rural and village districts shall submit the by-law to the ratepayers.[1] In town and city districts the council, upon being informed of the authority to borrow shall hold a vote on the by-law and the carrying charges are added to the high school levy.[2] However, in large school units the bylaw does not have to be submitted to the ratepayers unless The Local Government Board requires it.[3] Generally, if the capital borrowing does not exceed 1½ per cent of the current taxable assessment, a vote will not be required. However, the total of outstanding capital loans or debentures must not at any time exceed 8 per cent of the total assessed valuations.[4]

Financing requires that if building costs cannot be paid from grants, current revenue[5], or accumulated surplus, debenture borrowing should be arranged. The Foundation Grants Act, 1970, indicates that the Minister may determine "recognized expenditure" including debt retirement of school boards for purposes of determining grants. The Act provides further for the payment of special grants through order-in-council. All building grants are paid under this section, which reads as follows:

> Section 10 Out of moneys available for education, the Lieutenant-Governor-in-Council may, either unconditionally or upon such terms and conditions as may be specified in the order, on the recommendation of the minister, order the payment of an increase in any grant payable hereunder and the payment of a special grant, for any purpose whatever designated in the order, to any school system or to any group of school systems and the payment of a special grant for any education purpose whatever.

The amount of grant is not specified by the regulations but is subject to department policy concerning the amount of support for approved projects.[6] Debenture issues as approved by the Local Government Board and finally authorized by the Lieutenant-Governor-in-Council may not exceed an

---

1. There are 66 independent districts as well as the Northern District and 12 city and town districts. Many small districts are now included in the large school units and applicable legislation indicates that,
    > It shall be the duty of every unit board and it shall have power,
    > (2) to provide at the cost of the unit adequate school accommodation for the needs of all the school districts in the unit and to equip the schools. (Sec.81, School Units Act).

2. Sections 51 - 59, The Municipal Act.

3. Section 120 (2), The Larger School Units Act.

4. Section 120 (2), The Larger School Units Act.

5. Current revenue tax cannot be over 3 mills without approval of the Local Government Board nor can the Building Reserve Fund be greater than 10% of the budget expenditure.

6. More details in the section on support.

amount equal to 15 per cent of the total assessment of a district or 8 per cent of the assessed property values in a large school unit.[1]

Debentures must be sold or committed before the project is tendered or at least before the contract is signed which implies a realistic estimate of probable costs. The district must sell at least one-half the debentures and the province may assume the rest. The School Act requires that boards shall levy annually for a sinking fund to repay debenture principal and interest.[2]

MANITOBA

The Public School Act of Manitoba provides for the establishment of a Public Schools Finance Board within the Department of Education. The statute stipulates that pursuant to various approvals the Finance Board,

> 504(1) shall ... pay to each unitary division grants in respect of the costs incurred by the unitary division[3] in respect of construction of schools or improvements or additions to schools of a capital nature ... (and) payments of principal and interest on debentures or securities issued for capital purposes, by the unitary division, or the liability for which has been assumed by or transferred to, the unitary division ... calculated in the manner prescribed in the regulations and, in any case, not exceeding amounts prescribed in the regulations as the maximum amounts of grants payable for or in respect of any specified costs.

Recognition of need for capital projects is subject to the approval of the Finance Board and the Minister. A school board may then pass a bylaw. Legislation specifies that,

> 505(1) ... a unitary division may, if authorized by bylaw of its board, borrow money on the credit of the division for capital purposes and issue debentures or other securities to secure payment of moneys so borrowed.

However, it must have authorization for its bylaw from the Manitoba Municipal Board as well as approval of the Finance Board as "no monies shall be borrowed for capital purposes or other securities issued with respect thereto by a unitary division" without both of these approvals.[4]

If the proposed borrowing is fully supported under grants regulations the Finance Board may approve the borrowing and issuing of the debentures without a plebiscite in the division. If the Board has some doubts, "it may on its own initiative, or shall at the request of the board of a unitary division, refer the matter to the Minister".[5]

---

1. Section 180, The School Act and Section 122 of The Larger School Units Act.
2. Section 184, The Schools Act.
3. Nearly all school districts are part of unitary school divisions.
4. The Public Schools Act, Section 505(2).
5. The Public Schools Act, Section 505(5).

The Minister may approve the bylaw or refer it to a vote of the resident electors of the division and then shall approve it if a majority vote of the resident electors shows favor for it.

Legislation further specifies that regulations may be formulated pursuant to the Act that would define capital purposes and prescribe the provisions in respect of costs incurred and the manner in which supporting grants may be paid for capital expenditure.[1]

Regulations pursuant to the Public Schools Act define capital expenditure as an amount paid through debenture borrowing or otherwise for "purchase, erection, furnishing, equipment, enlargement, remodelling, renovation or replacement of accommodation".[2]

The regulations also specify conditions whereby the Finance Board may pay to a school board the lesser of either the actual amount expended for capital expenditure or the amount approved and authorized.[3] This would mean that support prices might be different for different regions if approved. Some small projects may be included in capital-out-of-revenue as ordinary expenditure in approved budgets.[4]

The financing involves Department analysis of the tender on the approved final plans for the building. When this is done the Finance Board will determine an amount as the approved cost for that particular project and indicate the amount of debentures needed to the financing authority. The school board may then give first reading to a bylaw to be submitted to the Finance Board for approval after which it is sent to the Municipal Board for authorization of the proposed borrowing. Upon receipt of this the school board will give the second and third reading to the bylaw and notify the Finance Board which may process the necessary financial arrangements. Except in special circumstances, there is no plebiscite as the approved cost will usually correspond to the tender.[5]

---

1. The Public Schools Act, Section 507

2. Manitoba Regulation 413/70, No. 25

3. Regulation 143/70, No. 26 - 29 and No. 37

4. Such small jobs on a cash basis are apart from upgrading which is not considered a capital expenditure.

5. However, a swimming pool might be installed in joint action with a municipality for extra cost; again a district such as Winnipeg might have a capital reserve fund and could finance an unapproved kindergarten project though it might need a plebiscite.

ONTARIO

In Ontario, support is given for new buildings, additions, or renovations to existing ones. These are classed as permanent improvements, and costs of them as extraordinary expenditures. The Department of Education Act stipulates that,

Section 12 Subject to the provisions of any statute in that behalf and to the approval of the Lieutenant-Governor-in-Council, the Minister may make resolutions with respect to schools or classes established under The Public Schools Act, The Separate Schools Act[1], the School Administration Act, The Secondary Schools and Boards of Education and this Act (The Department of Education Act), or any predecessor of any such Acts, and with respect to all other schools supported in whole or in part by public money, . . . prescribing the accommodation and equipment of buildings and the arrangement of premises.[2]

It is further specified that the Minister may make regulations providing for the distribution of moneys raised by the Legislature for educational purposes; prescribing the conditions governing the payment of legislative grants; prescribing definition of "approved costs" for the purpose of legislative grants to boards; requiring that approved costs be subject to the approval of the Minister; and they may also govern boards' budgetary estimates for any purpose. The Regulations pursuant to the statute specify that,

> "capital appurtenance" includes schools, additions, alterations, renovations, and sites

and that,

> extraordinary expenditure means expenditure for capital appurtenances, debt charges, and other specified items.[3]

Ordinary expenditure excludes expenditures for capital costs. Recognized extraordinary expenditure is subject to the approval of the Minister. It is recognized that extraordinary expenses include annual current debt charges and annual costs for old debentures, as well as limited expenditure from the revenue budget that is the lesser of one mill levy on the equalized assessment or the sum of the approved budget

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1. The secondary and Boards of Education Act does not apply to Separate Schools.

2. Section 12(1) and (1) (5) of the Department of Education Act, R.S.O., 1969.

3. Ontario Regulation 59/71 for General Legislative Grants for Elementary and Secondary School Board; No. (1) (h) and (1) (p).

portion for capital and approved expenses for equipment.[1] The Regulations (No. 11) have provided that, with some exception, boards would receive an Extraordinary Expenditure Grant that is in excess of:

(a) the recognized extraordinary expenditure over
(b) the sum calculated at the extraordinary expenditure mill rate upon the appropriate assessment maximum.[2]

Capital expenditure in public schools from current revenue must not exceed one mill upon the relevant assessment. All improvements costing more than this levy must have Department of Education approval whether or not they qualify for legislative grants. Debenture borrowing for approved costs must have the approval of the Ontario Municipal Board. Actually, most projects are financed by debentures sold to the Ontario Education Capital Aid Corporation at an interest rate which is usually lower than that on the open market.

Legislation empowers boards to issue debentures and The Department of Education Act states that,

> Section 8(1) The Lieutenant-Governor in Council may authorize the Treasurer of Ontario to guarantee payment by the Province of any debentures issued by an elementary school board in Ontario or by a municipality in a territorial district for any school purpose for which the board or municipality is authorized to issue debentures.

The comprehensive Regulations indicate the procedures and degree of support for informing boards about financing school construction.

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[1] Regulation No. (1) (3rd). Regulation No. 17(c) indicated that in 1971 "recognized applicable expenditure" was intended to include extraordinary expenditure that is not in excess of the recognized extraordinary expenses for the year plus the annual debt charges plus the portion of capital expenditure from the revenue fund that is excess of 100% but not in excess of 125% of the net capital expenditure from the revenue fund included in the recognized extraordinary capital expenditure.

[2] Regulation No. 10 - Extraordinary mill rate means
-for elementary school boards, the rate obtained by calculating the expenditure per weighted pupil times 36 divided by 55 up to $55 a pupil plus expenditure per pupil times .06 divided by 55 in part where costs exceed $55 per pupil.

-for secondary schools boards, . . . the expenditure per weighted pupil times .20 divided by 85 up to $85 per pupil plus expenditure per pupil times .04 divided by 85 where the expenditure exceeds $85 per pupil.

Statutes in Quebec require government approval of projects and expenditures to be financially supported. The Education Department Act stipulates that,

> Sec. 224. It shall be the duty of the school boards in each municipality: (3) . . . to build, repair and keep in order all school houses and their dependencies; to purchase or repair school furniture . . .[1]

The section specifies further that,

> "If this necessitates a loan, no acquisition, leasing, construction, or repair mentioned in paragraph 2 or 3 of this section may be carried out unless the school corporation has previously obtained the authorization of the Minister and has complied with the formalities of the law with respect to loans, and has negotiated the loan which it was authorized to make for such purposes."[2]

Except for districts within Quebec or Montreal, no board may contract for construction or improvements unless funds have been appropriated.[3] The Act provides that,

> Sec. 230. Any school corporation may also, with the authorization of the Minister of Education and the Minister of Municipal Affairs, borrow moneys and, for such purpose, issue bonds or debentures or notes, but only in virtue and under the authority of a resolution indicating:
> 1) the objects for which the loan is to be contracted.
> 2) the total amount of the loan.
> 3) the term of the loan.
> 4) the maximum rate of interest.
> 5) all other details relating to the issue and the loan.

The Minister of Municipal Affairs may require from the school authority all other information he may deem proper and he may then, after consultation with the board, and on the recommendations of the Minister of Education, amend a loan resolution submitted for his approval; this is dependent upon receiving a subsequent request by resolution from the board, showing there is no change in the total amount of money to be borrowed, nor any change in the interest rate of more than one percent. Such a resolution does not have to be advertised. Practice has evolved requiring the approval of the Quebec

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[1] Education Department Act, R.S.O., 1964, Ch. 235

[2] Amendment to Education Act 1966/67.

[3] Section 225, Education Act. There may be cases of urgency where orders of the Department of Health (or other conditions) prompt the board to ask the Minister to derogate from the provisions of this section.

Municipal Commission as well as the authorization of the Ministers before a loan may be contracted. The Quebec Municipal Commission Act, 1964, provided for establishment of a Commission whose duties included examining the financial position of any municipality and considering for approval, requests by school trustees or commissioners for borrowing authority. The Act provides that,

> " . . . every loan contracted by a municipality or every renewal of a loan contracted by a municipality must, in order to bind such municipality, be approved by the Commission."[1]

There is the usual requirement concerning repayment of annual principal and interest; the law specifies that any resolution for the borrowing must impose upon the taxable property held for the payment of such bonds or such loans, an annual tax sufficient for the payment of the interest each year, and at least one percent of the amount of the loan besides the interest, to create a sinking fund for the extinction of the debt.[2]

Budgets must be approved according to Section 359 of School Act which states,

> "Between the fifteenth and thirtieth of June, every school board shall prepare and submit to the Minister its budget for the ensuing school year. Such budget shall be of no effect until it has been approved by him".

Current legislative proposals are that the school board shall incur only the expenses authorized by the Minister and that the government "may make regulations to define the operating investment and debt service budget and expenses eligible for subsidies".[3]

Local school boards are responsible for the teaching at the primary level whereas regional boards are responsible for high

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[1] Section 24, Municipal Commissions Act, 1964. Section 233 of the Education Act specifies also that, "Every bond or debenture, before delivery thereof, shall bear the seal of the Department of Municipal Affairs and a certificate of the Minister of Municipal Affairs . . . establishing that the resolution authorizing the issue of such bond or debenture has been approved by the Lieutenant-Governor in Council or the Minister of Municipal Affairs as the case may be."

[2] Section 231, Education Act, 1964.

[3] Bill 291, - 1972 Session of Legislature.

schools.[1] If debentures are issued by a regional board, the school boards which are members thereof are liable for payment of such bonds or debentures, in proportion to the valuation of the real estate taxable by each of them at the time of maturity.[2]

Bill 291 for 1972 legislation proposes a new financing system for allocation of tax levies to local or regional boards.[3] The government fixes a normalized tax rate and subsidizes the boards for the difference between the taxes levied and the amount of approved expenses. However, if local or regional boards wish to incur expenses not eligible for subsidies they must levy or tax at a rate higher than that set by the province to secure the additional funds if they have no other sources of revenue. It thus appears that they might levy a local tax for extra expenditures beyond the approved budget such as for excess costs in a building. Borrowing for this expense or for costs of excess area is not approved. All plans for school buildings must be approved as specified.:

> Sec. 250. Notwithstanding any legislative provision incompatible with this section, the work of building, rebuilding, or enlarging schools cannot be validly authorized by school commissioners or trustees, under sanction of nullity, unless the plans and specifications for such work have been previously approved or furnished by the Minister.

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[1] The Education Act, 1964, (Sec. 45) provided for establishment of school municipalities under commissioners or trustees either elected or appointed. Section 64 stipulated that "The School Commissioners and trustees shall divide their respective municipalities into school districts designated by numbers." Reorganization established 64 regional boards responsible for secondary education and, until recently, 1200 local boards administered elementary schools and provided funds for operation of regional boards. Local boards may conditionally delegate authority to regional boards (Sec. 495A) Proposed legislature would change the method of financing.

[2] Section 373 of the Education Act, 1964, provides that school trustees may examine the assessments of areas within their jurisdiction and if they find them not uniform, they may amend the valuation of taxable property of all parts of the municipality in order to equalize or normalize the tax rate. This will involve retaining municipal valuation experts before homolgating the valuation rolls. Other conditions may also obtain such as the O/C 2970 which directed reimbursement of 35% of 1969-70 school taxes on farms including buildings.

[3] The proposal is that local school boards may, for their eligible expenses for primary schools, receive three-quarters of the tax levy on residential property and regional boards may, for the operation of high schools, receive the tax levy on corporations as well as the remaining one-quarter of the tax on residential property.

The School Board Grants Act provides that,

> Sec. 12. The Minister of Education may grant such financial assistance as he deems necessary to any board that erects, enlarges, or repairs a school in accordance with the regulations.[1]

The funds provided for approved capital costs may come partly from bond issues for which annual debt servicing is provided through the Department of Finance.

NOVA SCOTIA

Legislation in Nova Scotia provides that school board authorities[2] shall make provisions for the education of all resident pupils. They are therefore obliged to identify accommodation needs and secure initial approval by the Department of Education for a building project.[3] However, the Municipal Council is responsible for the construction and financing arrangements, except where amalgamated school boards operate.

The Municipal Act stipulates that,

> 224 "When it becomes necessary to erect, acquire, purchase, alter, add to, improve, furnish or equip buildings for public schools in the Municipality, or to acquire land therefor, then the Council, or such committee as it may authorize in each specific case, shall acquire the said land and perform the said work."

Regulations pursuant to the Education Act stipulate that school authorities must notify the municipality annually concerning school construction needs and preliminary cost estimates.[4] Boards are also

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[1] He may, at the request of such a board, deposit in the hands of the "Minister of Finance the amount of such assistance awarded to it in order that the Minister may pay out of such amounts at the maturity dates, indicated by the board, the principal and interest of the bonds issued by the board after July 1st, 1968." The request of the board for a loan will indicate the amount of grants which will be so remitted and which will have effect as soon as the Minister of Finance agrees to give effect thereto.

[2] There are municipal councils of municipal areas in each of which there are municipal school boards. Towns are school sections under a board of commissioners with similar powers to those of municipal school boards. There are also large amalgamated districts including towns under jurisdiction of an amalgamated school district board, pursuant to Sec. 54A of the Education Act.

[3] Education Act, Section 48(2): similar provisions are indicated in the Towns Act, Sec. 129.

[4] Regulation No. 18 pursuant to Sec. 66 of the School Act.

required to notify the municipal council when request for any building approval is sent to the Department of Education.

Regulations also specify that,

> 4 (1) "No school building shall be constructed nor shall substantial alterations to a school building be made unless the plans and specifications for the building or the alterations have been approved in writing by the Minister, the Fire Marshal, the Minister of Public Health, and the Minister of Public Works."[1]

The regulations also specify that amounts to be paid in support of costs of school construction.[2] This information is basic to the cost estimates first prepared by the school board. The Department of Education approves the building proposal and plans.

Financing is arranged by the Municipal Council after it has committed itself to a particular building program. It initially provides total cost estimates to the Department of Municipal Affairs and seeks its preliminary approval of proposed borrowing. In the incorporated towns the Municipal Council may conduct a plebiscite or open vote in a public meeting about a building proposal.[3] The only exception to the responsibility of Municipal Council in the above matters is where amalgamated school district boards exercise authority. The Department of Municipal Affairs must approve any resolution or bylaw for borrowing by debentures and controls their sale and time of issue. A Municipal Finance Loan Fund may provide for about one-half of them and the rest will be offered on the open market. Debt servicing represents a share of the approved cost as there are no separate grants except such as are provided through the DREE program.[4]

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[1] Regulation pursuant to Section 3, Education Act.

[2] Regulation No. 22 pursuant to Section 66 of the Education Act. Reviewed in the section under financial support for capital costs.

[3] Such plebiscites or open meeting may defeat a school board's building proposal. The Municipal Council of an incorporated town appoints the school board.

[4] The Department of Regional Economic Expansion (DREE) may make grants for various facilities in selected growth areas.

NEW BRUNSWICK

The government of New Brunswick assumes total responsibility for the financing of approved construction, renovations, and repairs to school buildings. The anticipated annual costs are incorporated in the provincial budget for expenditure each year. The School Act, 1966, provides that, after consultation with the school board, the Minister

7. (c) may construct and furnish school buildings.

Before October the school authority shall submit a report on educational requirements to the Minister who shall provide each school board with a budget after any necessary consultation with it.[1] Only such sums as shown in the budgets may be spent unless there is approval of supplementary programs which may include "any capital expenditure beyond the budgets provided for . . ."[2]

When a school board makes a proposal for a supplementary program the Minister shall, according to Section 12, publish the relevant facts in a newspaper having general circulation in the district and if within 15 days following publication 5 percent or more of eligible voters protest he shall hold a plebiscite. If less than 5 percent petition, the board is notified that it may proceed. The section also states that,

> (5) Each year the Minister shall advise the Minister of Municipal Affairs of the amount of money required to implement or operate a supplementary program in a school district.

Local taxes will effect reimbursement of the extra costs incurred through a special levy on the assessment of the district. The same section states that,

> (6) The Minister of Municipal Affairs shall raise the money required under Subsection (5) by taxation within the school district in accordance with the Real Property Tax Act.[3]

Additional facilities may be desired for community use or satisfaction of some local demand beyond what is considered necessary for

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[1] Section 9(2) The Schools Act, 1966.

[2] Section 9(4) and Section 1 (1) (iii)

[3] A later amendment in 1969 required that he shall pay any money raised under Subsection (6) to the Minister of Education.

the instructional program. The Schools Act (Sec. 61) stipulates that the Lieutenant-Governor may make regulations for the arrangement and order of school property. This applies to all features of new construction and renovations and to most repairs as it is acknowledged that the buildings are the property of the province.

As financing for construction is now performed by the government there is no longer any need for school boards to secure debentures.[1] Some areas are selected for DREE programs.

PRINCE EDWARD ISLAND

This province has had considerable legislation and regulations concerning school buildings, financing, and cost control. Guidelines indicate education specifications and support amounts were specified for different facilities. However, most of these will be superseded by application of the new School Act whereby the government may assume all school construction costs.

Nevertheless, central decision continues about financing and the need and nature of facilities. The new Act specifies that,

> 60. The Lieutenant-Governor-in-Council may make regulations
> (c) fixing the date for providing regional school boards with their annual budgets.
> (t) prescribing the manner of conducting a plebiscite under this Act.
> (w) designating who are eligible voters in a regional administrative unit for the purposes of this Act.

The regional board,[1] according to Section 8 (1) and (2), prepares a budget for discussion with the Minister who may then issue his approval. Preliminary needs are indicated as the Act further specifies that,

> 21(2) On or before a day to be fixed by regulation, in each year every regional school board shall prepare and submit to the Minister,

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[1] The Municipal Capital Borrowings Act, 1963, which replaced the Municipal Debentures Act, 1952 stated that (5) no application shall be made to the Municipal Capital Borrowing Board to borrow by loan or debenture unless the loan or debenture is authorized by the board of trustees of a city or town, but not including trustees of a school district authorized to borrow under the Schools Act. This act, changed in 1966, was chiefly for Municipal purposes and had little significance after the new Schools Act, 1966.

[2] There will be 5 regional administrative units including Charlottetown and Summerside. Each will be under a regional board of 15 members, 10 of which are elected and 5 appointed. Local school boards no longer exist.

> (b) a report containing
>   (ii) a proposed budget of operating expenses and capital requirements for the unit for the following year.

It also stipulates that,

> 22. A regional school board may expend only such sums as are in its budget provided for in Section 8 or in any supplementary budget provided by the Minister.

A supplementary program may include (Section I (q) "any capital expenditure beyond the budget appropriation provided for in s.s. (2) of Section 8 and subsection (I) of Section 23". The statute asserts that if a regional board requests approval for a supplementary program, the Minister shall publish the relevant facts in an appropriate newspaper, and if 5 percent or more voters protest within 30 days a plebiscite shall be held. If less than 5 percent protest the program proceeds or if there is a favorable vote the Minister may authorize the board to proceed.[1] It follows then that if a school board decides to secure any extra area it shall assume the cost. The new Property Tax Act permits a levy of 1.1% on the qualized assessment throughout the province to be levied and collected by the province. Thus a regional unit might be individually taxed annually for reimbursement of the supplementary expenditure. The extra space would probably be part of the total project to be constructed under government direction rather than by the district board. In any event, the School Act specifies that,

> 55. No school board shall make any purchase or enter into any contract of any kind without the permission in writing of the Minister obtained in advance.

Policy now is that Public Works will direct the construction and that financing is approved and arranged through the Department of Finance.

NEWFOUNDLAND

Nearly all school buildings in Newfoundland are owned by religious denominations or their associated boards[2] and there has been no statutory obligation to provide capital support for these church-owned

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[1] Sec. 56(I) The Schools Act. Section 56(6) also specifies that, The Minister shall see that the money required to implement and operate the supplementary program within the regional administrative unit is raised in accordance with the Real Property Tax Act.

[2] Districts established in many areas by legislation of 1960 and 1968.

schools. However, in recent years the greater cost of school construction has been borne by the government through grants of various sizes provided in the annual budgets of the Legislature. These grants were allocated in specified proportions on a per capital basis to the school authorities of various recognized denominations.

The School Act, 1969, stipulates that "the moneys for the purchase of land or buildings or for the erection, extension, or equipment of public schools shall be paid to appropriate Education Committees and shall be allocated and applied by the Education Committee for such purposes but that no allocation made on account of any such purchase, erection, extension, or equipment shall exceed ninety per centum (90%) of its cost"[1]

Legislation requires as a condition of eligibility for grant that the school authority must own the site and, as in many other provinces, until building plans have been approved, the School Act stipulates that,

> Section 83 (3) Money shall not be paid for the construction or extension of any public school until the building plans and the site have been approved, by an official of the Department designated for the purpose by the Minister.

A proposed building must meet the standards of the National Building Code before the Department of Public Works and the Fire Commissioner will approve the plans. Strict observance is demanded in respect of the new buildings or extensions as well as the new schools built under the DREE program.[2]

Financing is largely effected by the grants to school authorities as there is no capital aid fund from which they may borrow by means of debentures. Subject to approval of the Minister,[3] a school board may charge an assessment to the parent of any child attending its schools from outside School Tax Areas and such monies

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[1] The Schools Act, 1969, Section 85

[2] The federal Department of Regional Economic Expansion.

[3] Section 13, The Public Schools Act, 1968.

must be applied to the Capital costs or operational expenditures.[1] The School Tax Authority shall submit to the Minister for approval a budget for the schools of its area. The Authority may, subject to Ministerial approval, impose a conditional poll tax as well as the real property tax to augment the funds of the school boards of the area.[2]

SUMMARY

The survey shows that every province has legislation concerning the provision of school facilities and requirements for financing them. Statutes frequently provide for Department approval of budgets and specify that no capital expenditure may be made without government approval. Local jurisdictions build the schools in all provinces except in New Brunswick and Prince Edward Island where the governments arrange for their construction and pay the costs. In these provinces there is no debenture borrowing nor is there in Newfoundland where assistance is given as a grant. Local authorities, in all other provinces pass bylaws to secure debentures for nearly all approved capital expenditure. Voting on required plebiscites is restricted to property holders only, except in Alberta or Manitoba where resident non-ratepayers may also vote. In Ontario there is no provision for a plebiscite as bylaws are not advertised.

Each province provides for government approval of borrowing. A Municipal Board in Manitoba and in Ontario considers approval; a municipal commission in Quebec and the Department of Municipal Affairs in Nova Scotia decide on requests. The approval of the Departments of Education is usually required as well. A Local Authorities Board in Alberta and a Local Government Board in Saskatchewan perform similar functions. A Finance Committee of the Department of Education provides approval in British Columbia and the Lieutenant-Governor makes the final authorization.

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1. One or more municipalities or any portion of one or more of them as well as the possible inclusion of land outside the municipality may be declared a School Tax Area. Section 97 and 98 - The Public Schools Act, 1968. School Tax Authorities have been set up in various areas. There is also provision whereby the board may allow an exemption of all or part of the assessment because of poverty; Section 100.

2. Section 26 and 27 of The Local School Tax Act, 1970, Section 31 specify that anyone whose annual income is less than $1500 is exempt from the School Tax.

Statutes and regulations legalize the method of repayment and any limits of borrowing according to assessments. Debenture funds are secured through a Municipal Finance Corporation in Alberta and from an Education Capital Aid Corporation in Ontario. A School District Financing Authority in Manitoba and also in British Columbia arrange for funds. Boards in Quebec receive part of their funds from the Provincial Consolidated Fund and the rest from bond issues sold on behalf of the boards and debt serviced by the government. The Saskatchewan government purchases one-half of the debentures and in Nova Scotia, also, a part of the funds not provided through the government must be sold on the open market. Such financing must be effected before construction contracts are finalized. There is provision in some provinces for short term loans for small projects or for interim financing until debenture funds are forthcoming.

CHAPTER II

GOVERNMENT SUPPORT OF CAPITAL COSTS

BRITISH COLUMBIA

Capital costs are approved and a share is supported in relation to specified levies on existing assessments. The amount of support is thus stipulated as

Section 183 (b)(i) fifty per centum of the total expense calculated under clause (a) until the share of such expense borne by the Board of the School district has reached an amount which is equivalent to a levy of three mills on the assessed values of land and improvements within the school district; and

(ii) seventy-five per centum of the additional expense calculated under clause (a) until the share of such additional expense borne by the Board of the school district has reached an additional amount which is equivalent to a levy of one and one-half mills on the assessed values of land and improvements within the school district; and

(iii) thereafter ninety per centum of the additional expense calculated under clause (a) for that year;*

The total amount of grant would be subject to any adjustment pursuant to existing statutes. As the schedule pertains to shareable costs, it follows that the capital amount in the budget would correspond to 6, 9, or 12 mills respectively for the various support figures. The government does not stipulate a uniform support price. For a particular project, cost estimates are approved which become the basis of shared support. High estimates may require explanation before approval is finalized. Besides its portion of shared costs the school board would also assume capital expenses which are specified as not eligible for support. Approved costs may be revised at the final stage in response to changing conditions. They include the building tender, a 5% contingency sum, and a 6% architect's fee, and up to 5% of the contract for specified items of site development.

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* Application of the schedule implies that where the total indebtedness represents less than 6 mills (3 mills of local cost) of the assessment the sharing is 50%; where it is between 6 and 9 mills the sharing is 50% of the first six mill application and 75% of the rest by the government and 25% by the district; and where the total indebtedness represents more than 4½ mills of the shared part (over 9 mills), the sharing is 90% by the government and 10% by the district. e.g. Vancouver District would receive of the shared cost and so would Victoria which received one-half of its 25 millions of capital expenditures from 1947-1967 whereas a district such as Delta in the Ladner area might qualify for 90% support with an expected capital expenditure of 11 millions.

Support is also given up to 50% of the cost of school sites[1] of approved sizes and for a share of the cost of portables. An amount for equipment is determined by the Department according to the program in the school. Specified limits may be $1800 per elementary classroom or 10% of the contract for secondary schools. An allowance for a library resource center may correspond to $800 per classroom. Equipment allowances are usually for a total amount which may be distributed according to local desire.

ALBERTA

Limited capital grants were introduced in the early fifties[2] and the principle was soon established for support of approved instructional facilities and in the sixties of approval non-instructional area as well. Amounts per square foot of total area were specified and revised periodically. Following a trend of lower tenders and a Report of a Research Committee, regulations were revised in 1970 and currently specify support as $15.50 and $16.25 per square foot respectively for approved areas of elementary or high schools.[3] This constitutes the ceiling of support applicable throughout the province. Unsupported debenture funds may be provided for excess costs over these figures. Plans are examined to determine the amount of instructional and non-instructional space eligible for support as debenture funds are not available for unapproved areas.

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[1] Costs for more area would be regarded as non-shareable.

[2] The School Building Borrowing Assistance Act, 1950, provided for some grant assistance for capital borrowing. The principle quickly evolved that support should be instructional facilities and this was observed from 1954 to 1962. Under a new School Building Act, 1962, support for debentures was specified up to $12 a square foot of approved area for instructional and non-instructional areas. The amount was raised to $14.00 in 1963 and to $16.00 in 1966. A differential of support was established in 1967 of $16.00 for elementary schools and $17.00 for high schools with a further allowance of $1.50 for some technical-vocational spaces.

[3] Section 18(1), The School Buildings Regulations. The Board may approve the actual cost of new permanent-type construction up to a maximum of $15.50 a square foot of approved gross area for elementary schools, and $16.25 for junior and senior high schools. In the case where a school combines provisions for elementary and junior and/or senior high school grades, the maximum shall be set according to the ratio of total functional home room space in the whole school for elementary purposes and the total functional home room space for junior and senior high school purposes..."

Additional support may occasionally be approved in unusual situations such as abnormal soil conditions. Support is not given for purchase of sites. Nor is it specified for site development except as part of the contract that includes installation of services. Neither is support specified separately for furniture and equipment except for vocational sections. However, where a contract price is less than the support price the difference up to a $1.00 a square foot and a further one-half of any difference balance that may be used for equipment or site development. Up to 90% of the cost of approved vocational equipment is supported. Support may be approved for the actual cost of portable schools or relocatable units up to $12.00 a square foot of approved gross area. This includes transportation, setting, and connection to services.

SASKATCHEWAN

Policy for support in Saskatchewan involves an equalization factor based on assessments and on assigned costs. The Department approves the plans and specifications and the estimated cost. It then determines a percentage of building cost. This percentage varies from school system to school system and is the ratio of the foundation operational grant to the recognized operational budget for each system, except that there is a minimum grant of 20% and a maximum of 40%. The approved building cost has normally been the amount of the approved estimated cost, provided that this cost is consistent with that estimated at the time of issuing approval plans. The approved cost is based on the architect's estimates and may be revised under special conditions. The specifications may be changed if tenders are considerably higher than estimates. The support is frequently about 30 percent of the cost at the time of construction. Debentures may be secured for the necessary remainder and the board must levy in the current year an amount equal to the first installment on the debenture debt which may amount to 10% of the building cost.[1]

Support is more than initial grant, however; annual debenture payments are acknowledged as part of the year's budget recognized for operating grants. The significant consequence is that the Department

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[1] For example, an approved cost of $100,000 may warrant a grant of $30,000 and if there are no surplus funds to reduce the remaining debt of $70,000 the board's current levy may be $7,000 leaving $63,000 of debentures which may be supported annually as operational costs.

supports, in addition to the grant, the debenture payments in subsequent years so that the district actually pays only that part of the cost taken from any surplus funds and possibly a part of the first year's levy. Costs of portable units are supported usually at a cost from $10,000 to $12,000.

Regulations also specify debt servicing for principal and interest of outstanding debentures less any portions of debt retirement that may be considered ineligible for grant support.

Allowances for furniture and equipment are not included in capital grants, but may have limited support through operational grants.

MANITOBA

Proposed buildings in Manitoba must have approval as support is related to cost. The tender on any construction project is analysed in determining the final approved cost and the support may then be 100 percent of that approved cost. However, the figure of $18.50 a square foot was adopted as a basic amount by the Finance Board[1] as a result of experience. The approved amount includes fees and one-half percent as a contingency sum. Working drawings are examined carefully to determine what revision in specifications may be necessary to secure tenders at the support price so that excess costs may be avoided. Excess area over that approved is not accepted. Support may vary occasionally according to location[2] or regional requirements related to soil situations or other conditions. The Finance Board must feel assured that the facilities are needed, that they will be functional, and that the cost is reasonable. Debt servicing is through the Foundation Program Fund.

Support is also provided for the purchase of portables. Costs of furniture and equipment is supported up to 80 cents a square foot. After vocational equipment is approved for support, the school board may endorse the requisition for its purchase through the provincial purchasing agency.

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[1] The Public Schools Finance Board was established in 1967.

[2] A recent example occurred at Thompson where approved cost was established at $19.31.

ONTARIO

Financial support of school construction in Ontario is a share of recognized costs for approved facilities. Variations in the proportions pertain chiefly to regional assessment. Normally, support throughout the province has averaged about 80 per cent of the approved costs.[1] Under the revised Capital Grant Plan of 1971 this figure should increase to about 90 per cent.[2] This may permit design of a building at 10 per cent less than the approved cost so that the resulting inducement might promote full support.[3] Debentures are limited to 90 per cent of the approved cost plus a further 10 per cent of unsupported ones which may be applicable to the approved project without providing such funds for excess area. However, necessary costs may accrue for fences, sprinkler systems, or other features of site cost or development. Consequent expenditures may be approved without increase in support but unsupported debentures may be secured for them.

Financial support is for eligible spaces of approved sizes. Detailed regulations of the Grant Plan provide guidance to boards applying for legislative grants for school construction. Instructional area is specified as well as space for many non-instructional facilities in considering the gross area to be recognized. Approved floor area for support is the actual gross area less areas in excess of approved maximums as well as any other areas considered to be ineligible, such as swimming pools or space used only as an auditorium.[4] When a project includes a non-approved eligible space (e.g., an under-sized library) or a non-approvable space the actual gross area will be reduced by the area of

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[1] In recognition of increased building costs after 1967 grant approvals were supplemented by 15 per cent allowance. This was in addition to the 10 per cent permitted above the 90 per cent acknowledged as a share of approved costs.

[2] There is, of course, considerable overlap with projects previously recognized.

[3] For example, the approved cost of a building might be $1,000,000 with expected support of $900,000; but revision of design or specifications may attract a tender of $900,000 so that the total cost would be supported.

[4] Special conditions may permit an auditorium to serve such functions as to make it eligible space. Capital Grant Plans, page 804.

the non-approved and non-approvable space and the estimated cost of such space will be deducted from the cost of the project unless approval is received otherwise.

The calculated gross area for support includes the total of the net functional floor areas (n.f.f.a) approved multiplied by an applicable constant.[1]

Each eligible space in the approved project is awarded an Accommodation Unit Factor (A.U.F.) in accordance with specified instructions. A Table of Values[2] is established for the A.U.F. total and support is

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[1] Appendix 6, Capital Grant Plan, page 853. The following are examples:

Elementary Schools	n.f.f.a. x 1.80
Part Senior Elementary Schools	n.f.f.a. x 1.82
Senior Elementary Schools	n.f.f.a. x 1.85
Secondary Facilities	
Classroom, laboratories Library, gymnasium, etc.	n.f.f.a x 1.95
Commercial rooms	n.f.f.a. x 1.90
Occupational and technical shops	n.f.f.a. x 1.80

[2] ACCOMMODATION UNIT VALUES (TABLE I)
ELEMENTARY (1971)
(Including Senior Elementary)

ACCOMMODATION UNIT TOTAL	ZONES 1	2	3
800	$246.00	$262.00	$267.00
for each further 10: Deduct	0.25	0.25	0.25
2,000	216.00	232.00	237.00
for each further 10: Deduct	0.15	0.15	0.15
3,000	201.00	217.00	222.00
for each further 10: Deduct	0.10	0.10	0.10
4,000	191.00	207.00	212.00
for each further 10: Deduct	0.05	0.05	0.05
5,000 and over	186.00	202.00	207.00

ACCOMMODATION UNIT VALUES, SECONDARY (1971)

ACCOMMODATION UNIT TOTAL	ZONES 1	2	3
8,000	$158.00	$170.00	$174.00
for each further 50: Deduct	0.05	0.05	0.05
10,000	156.00	168.00	172.00
for each further 50: Deduct	0.05	0.05	0.05
12,000	154.00	166.00	170.00
for each further 50: Deduct	0.05	0.05	0.05
14,000	152.00	164.00	168.00
for each further 50: Deduct	0.05	0.05	0.05
16,000 and over	150.00	162.00	166.00

Note: Take the Accommodation Unit Total for the project to the nearest 50; 25 being taken to the next highest 50.

stipulated in respect of the total approved units according to the grade levels, programs, and the geographic zone in which the project is located. Most locations are in zone 1 but a few specified in zone 2 qualify for a higher support and three more in zone 3 are acknowledged for still more support. The net functional floor area is specified in relation to enrolments for each instructional facility as part of the eligible area. The eligible space includes the instructional area and a balanced portion of non-instructional space. Thus relevant ancillary and service areas such as offices, staff rooms, washrooms, mechanical rooms, and corridors are acknowledged in the Accommodation Unit Factors. The sum of these times appropriate support is basic in determining the approved support.

The approved cost shall be the net amount of the building contract plus a contingency sum up to 3 per cent plus architect's fees as well as approved allowance for furniture and equipment. Only built-in furniture and equipment would be recognized as part of the contract. The approved cost may be reduced to the amount of the actual cost if this is less than the approved cost. If the area of an eligible space exceeds the applicable maximum the approved cost will generally be computed only for the applicable A.U.F. of approved area. Thus there is no support for excess area unless it is acknowledged later. Significantly, any facility less in area than the approved minimum may be considered non-approvable. Support is also provided for recognized portables. Approved alterations may be supported at 90 per cent of the approved construction cost.

QUEBEC

For three years after 1968, Quebec's ceiling of support was $14.31 per sq. ft. exclusive of some further allowance for small schools and for furniture and equipment.[1] Building plans have been carefully supervised to control specifications and permit a cost comparable to the support price. Rising prices promoted a revision of support up to $15.60 per sq. ft. and a later revision in the normalized construction budget for approved cost in high schools of approximately $16.45 per sq. ft.

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[1] Additional support has been permitted for small schools on a scheduled basis; e.g. 10% increase for schools of less than $200,000 or + $15,000 sq. ft.; 6% increase for schools between $200,000 and $500,000 or a 30% increase for those between $500,000 and $1,000,000.

Cost estimates are submitted with working drawings for the approval of the Buildings and Equipment Branch which prepares a capital expenditure budget to be presented to the Finance Branch. Budget directors[1] stipulate that for debt service,

> "Expenditures incurred for the debt service are admissible only if they result from loans contracted to finance expenditures approved and deemed admissible by the Department; any amount in excess of this will be the exclusive responsibility of the school board."

and further,

> "The Department will consider as admissible for budget balancing grants capital expenditures from current revenues . . ., provided that these expenditures are approved specifically and jointly by the Directorate of Finance and the Directorate of Building and Equipment."

School boards are required to observe the standards and figures indicated by the Building Branch. Capital expenditures entitled to support may pertain to construction of new schools, additions or approved alterations as well as major repairs, interior furnishings, and provision of utility services. Related professional fees and acquisition of sites or buildings are also included. Support is approved in some schools for swimming pools as well as track and field facilities. Support is intended to cover the approved area and costs. However, if costs exceed the approved budgetary estimate the board must revise its specifications or pay the excess costs from the current budget as there are no debentures issued for this.

Most of the construction is now in high schools. As support for this, current practice is that the total approved capital costs for them is financed by Department of Education grants. These may be comprised as a grant of one-third from the Province Consolidated Fund and the remainder deriving from bond issues sold on behalf of the board and debt serviced by the government. Local boards secure funds for approved construction by means of short-term loans or debentures which are also supported by the government.

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[1] Budget Rules for School Boards.

NOVA SCOTIA

Capital support is provided in Nova Scotia as a part of the costs for approved facilities up to a maximum amount. The figure was revised in 1971 to $20.00 a square foot as the ceiling expense to be shared according to regional assessments. The regulations still specify that the provincial proportion to be paid toward the cost of construction "shall be either the actual cost or an amount calculated in the following manner, whichever is less."[1]

(a) Library - $20 per square foot to maximum $2000 times number of classrooms.
(b) classroom- $16,000 if standard size, less grant is smaller
(c) Science laboratory - $20 per square foot to maximum of $27,000
(d) Business education laboratory - $20 per square foot to maximum of $27,000
(e) Household science - $20 per sq. ft. to maximum of $24,000 per program
(f) Industrial Arts - $20 per square foot to maximum of $27,000 per program
(g) Gym & stage - $1.50 per cubic foot and Related areas - $20.00 per square foot total to maximum of $200,000.
(h) Cafeteria 500 pupils minimum - $20.00 per square foot to maximum allowed for 2 classrooms.
(i) Furnace Room or Electric Heat - $700 per register classroom.
(j) Administration Offices - $20 per square foot
(k) AV Aids - $20 per square foot to maximum of $40,000.
(l) Multi-Purpose Room - $20.00 per square foot to maximum of $80,000 (18' ceiling)- includes lockers, kitchen, washrooms, offices, and storage.

Grant support is for the instructional areas and some additional space that is approved. Thus costs for corridors and some other non-instructional space are not supported.[2]

The support varies for different regions. The proportion of the shareable costs depends on the equalized assessment of the municipality involved. If the tax levy provides $1.35 per $100 of assessment no capital support would be provided. As the tax revenue declines from $1.35 the proportion of support increases so that assistance may vary from nothing to 90 per cent.[3] A government committee examines the financial potentiality of a

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[1] Regulation No. 22 pursuant to Section 66 of The Education Act.

[2] For example, an elementary school might cost $15 a sq. ft. for the gross area but the figure up to $20 only applies to the shareable section as 25% of the space may be non-grantable.
A building might cost $750,000; but the shareable cost might be computed at $500,000 and the proportion of the support would then be determined according to the area's ability to raise revenue.

[3] For example, the assessment of the city of Halifax is such that it receives no capital assistance whereas some isolated other area with a very low assessment may receive very high support.
Some districts have been designated for assistance under the DREE program.

district and determines what percentage of the approved shareable cost is to be supported. This generally corresponds to the same proportion as is established for grants for operating expenses. Debt servicing is apart from the operating budgets which must also be approved with an indication of what the province will support apart from capital assistance.[1] The municipal councils may then pursue their desires for the building construction knowing the amount of capital assistance. An exception applies in "amalgamated areas where amalgamated school boards exercise authority and where the support is specified as,

> "either the actual cost or an amount equal to
> the number of sq. ft. in the area of the school
> approved . . . multiplied by $20, whichever is less."[2]

There again, the proportions involving assessment apply except that some economic advantage may accrue to these areas in that the debt servicing is included as part of the operating budget.

Support is provided as well for alterations, renovations and repairs for the actual expenditures approved as capital costs. Assistance is also given for some site paving, water supply and sewage disposal systems. New register classrooms may be accorded up to $1500 each in an elementary school of $3000 in a secondary school. A specified maximum support may be given for other areas than register classrooms. In addition, costs of library books are supported; the total amount granted in a year for books and related instructional materials shall not exceed $250,000 for the province. Support for equipping many other facilities is subject to the Minister's approval.[3] The result is that the actual cost considered for shareable support is the expenditure on the building, equipment and furnishings plus architect's fees and grading included in the contract. It does not include the cost of the land or major landscaping.

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[1] The original aim envisaged in the Foundation Program was that the province might pay 55 per cent of the cost of education and provide for adjustments in the ratio. Municipal costs throughout the province rose to 52 per cent in 1968 and to 60 per cent the next year but declined to 43 per cent in 1970. A more favorable ratio may be reflected in the ensuing years.

[2] Regulation No. 8 pursuant to Section 54A of The Education Act. The number of square feet is determined from outside measurements with application of a factor of one and one-half to the area of an auditorium-gymnasium to a multi-purpose area or visual aid area where ceiling is between 14 and 18 feet high.

[3] Details given in the Section on Furniture and Equipment.

NEW BRUNSWICK

New Brunswick assumes all capital expenditures for the buildings the Department has approved. Each fall expected costs for the ensuing financial year are submitted to the Treasury Board. The amount determined is incorporated into the provincial budget for consideration by the Legislature.[1] Basic taxes are paid into the provincial revenue fund for distribution with the legislature grants.[2] As the province is responsible for providing funds for the approved educational program including construction projects there is no necessity for loans or debenture borrowing by school boards. Though plans and specifications are carefully controlled costs have generally risen from $15 to a range of from $17 to $24 including the vocational high schools.

The support, however, corresponds to the established cost of the project unless there is some special additional supplementary feature to be paid for from local contributions or taxes.

A Capital Equipment Fund provides support for initial furnishings in new construction. Approved costs for replacing some equipment may be supported from a Replacement Fund. Major renovations estimated at over $100 are performed by the Department of Public Works.

PRINCE EDWARD ISLAND

In this province, until recently, support was specified as an amount for various facilities.[1] There was no support for excess costs or unapproved areas. Rising costs prompted new policy for support. The government has now undertaken to pay for construction of its approved facilities; the support includes the contract price, fees,

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[1] Some regions such as Moncton are designated as growth areas under the DREE program

[2] Local taxes may be levied for some extraordinary capital expenditure.

[3] For example regulations applicable in 1965-70 inclusive, specified a grant of $10,000 for classrooms, science laboratories, and spaces for home economics, multipurpose rooms, mechanical services and for approved cafeterias for a minimum of 300 pupils. The same amount was allowed for a library with an additional $1000 for books; $25,000 was allocated for gymnasiums.

and costs of site[1] and approved equipment. This provision for support was made retroactive to January 1, 1971 for the acknowledged projects. The Department thus assumes the expenditure whether by outright payment or by term financing. A provincial fund for buildings was established for 1971 whereby the government advanced 24 millions comprised of 12 millions in grants and 12 millions by way of loan from the DREE program. More may be expected as the whole province is now designated under the economic expansion plan.

Purchase has also been supported for the purchase of 117 portable classrooms over the past three years. The supported cost per unit was about $10,000, repayment of which was incorporated over a five-year period in the provincial budget.

NEWFOUNDLAND

As indicated in respect of financing, support of school construction in Newfoundland is by capital grants issued to school authorities associated with recognized church denominations. It is expected that the grant for any approved school will not exceed 90 per cent of the costs incurred. The law provides that a General Education Committee allocates and applies the grants and prescribes the conditions under which a grant less than 90 per cent of the cost may be paid.

The amount is frequently less because of insufficient funds for distribution. Communities or the School Tax authority may be responsible for raising the rest of the needed money. Though all regions may receive a similar percentage of support some areas may have comparatively small assessment resources from which to raise the local share. Some support comes from the Federal Department or support comes through the province from the federal DREE program.

There is also provision whereby some support may be given for maintenance and renovations. Legislation provides that the Lieutenant-Governor-in-Council may, upon the recommendation of the Minister, make regulations "providing for the allocation of monies voted for . . . maintenance and repair of public schools and for equipment and supplies

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[1] The government also pays for the land; if DREE in involved the federal government makes no contribution toward the purchase of sites.

for those schools."[1] The Denominational Education Committees may make grants for renovations for old schools out of the amounts allocated to them for school construction by the Legislature. The operating grant may be used for operating expenses, repairs, and maintenance.

SUMMARY

All provinces have provided financial support for capital costs. The government of New Brunswick and Prince Edward Island construct and pay all costs for buildings they have approved. Most other provinces approve a total expenditure for a project and then pay a share according to different conditions such as **assessment or** financial resources of the areas. Generally, the support may vary from zero or a small amount up to ninety per cent. For example, Ontario has supported from 35 to 80 percent of the total costs. Manitoba and Quebec approve specifications so that the ceiling amount of support pays most of the building cost. Alberta specifies a fixed amount of support for elementary or high schools regardless of areas or total costs. Support for furniture, equipment, or alterations shows less variation in different provinces. A summary chart may indicate the comparisons.

SUPPORT ALLOWANCES

	Construction Costs	Furniture, Equipment and Site Develop.	Renovations
British Columbia	50 to 90% of tender on approved cost of approved project according to district assessments.	Approved amount for vocational or non-vocational, also 50% for site of approved sizes.	As approved
Alberta	$15.50 and $16.25 respectively for elementary and high schools, some extra allowances for technical space	90% of approved vocational; none otherwise unless within the ceiling support for construction	Maximum amount approved
Saskatchewan	20-40% of costs of approved project according to asses. of areas, exclusive 10% of cost remaining debts may be debt serviced in the operating grants each year.	No capital grant but may have support through operating grants	Limited to grant approvals in operating budget

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[1] Section 101 - Public Schools Act of Newfoundland and Labrador.

Support Allowances (Con't)

	Construction Costs	Furniture, Equipment and Site Develop.	Renovations
Manitoba	Up to $18.50 on approved specifications (Special allowances possible.)	As approved for about $.80 per sq. ft.	Maximum amount approved, but chiefly for additions
Ontario	A share of the cost of different kinds of approved schools according to the A.U.F. of gross area and district assessment - average support is about $18. a sq. ft.	Support for an approved list accd. to same conditions as for construction	90 % of approved construction costs
Quebec	Up to $16.45 per sq. ft. budget on approved area and specifications. (Balancing grants sometimes allowed)	90% of approved items.	90% of approved amount.
New Brunswick	Government builds the schools at varying costs.	Initial equipment and furnishings supplied as approved.	built by the government if over $100.
Nova Scotia	A share of the cost up to about $20 on those facilities considered for shareable support. - Support varies from zero upward depending on district assessment.	as approved -special allowance for libraries and site development.	As approved
Prince Edward Island	Government now builds the schools at cost varying for region or program.	As approved in the whole project.	Supervised by the government
Newfoundland	Grants up to 90% of the approved costs of the building	Separate amount - May be approved	Approved amount may be given for maintenance and renovations

All provinces give approved support for recognized portables.

General Comments

It may be observed that the support granted in many provinces is related to the final approved plans that are tendered. There is a prevalent assumption in some areas that the support price should pay all capital costs for building, equipping, and updating instructional facilities

to accommodate the educational programs developed by Curriculum Branches. Arguments are propounded that Departments' responsibility for ensuring that districts maintain adequate programs imposes financial responsibilities on provincial governments. Significantly, legislation throughout the country has indicated that substantial financial assistance shall be provided for building schools. Experience in some provinces has indicated problems about specified amounts of grants and prompted a few governments to build the schools themselves. The opinion exists in some areas that when a support price is not fixed it may be adjusted according to particular conditions. Support in relation to assessment may be very defensible in relation to total costs. However, no matter how good the methods of assessment may be the question persists as to how equalized assessments may reflect applicable market values. The opinion has grown that assessment of property may not be sufficiently sensitive to a changing economy. It has occasionally been suggested that regulations for capital support might have an escalation clause to accommodate price changes for labor and material. This, however, would probably promote increases in costs. It is acknowledged that an escalation clause in the Toronto S.E.F. program contributed somewhat to higher costs than for other schools of conventional construction.

The most significant feature in respect of capital assistance is the periodic survey of cost factors and subsequent adjustment of support allowances.

CHAPTER III

PROCEDURES CONCERNING BUILDING CONSTRUCTION

Statutes and regulations throughout the country influence sequential procedures for securing government recognitions of building needs and approval of appropriate facilities, as well as for the finalization of plans and the acknowledged amount of financial support. Directives also exist for financing arrangements and for tendering the projects. It is in this field where the legislative provisions are implemented and where some controls in respect of them are reflected. A review of policies in each province indicates features of common or varying practice.

BRITISH COLUMBIA

Building desires of school boards, are presented to the Department early each year so that a survey of overall needs may be established on a long-term basis according to priority of need. The summarized information may influence the total amount of debentures to be made available so that boards may be notified about their allocation. The Department may visit districts to determine the essential needs for the next year and to offer architectural service in the revision of any proposals, particularly if there is a shortage of debenture funds. Aid may also be given in the preparation of referendums.

School boards seeking more accommodation must receive preliminary approval of the Department before they can hold a capital referendum. Recognition may be given in terms of instructional units or Teacher Entitlement Units (T.E.U.)[1] in relation to function of instructional spaces and pupil-loading. In considering applications, the Department regards certain principles such as the enrolment or the possible conveyance of the pupils to another center, or use of a dormitory or boarding arrangements for secondary pupils. The relationship of the program to the size of the high school is acknowledged in the suggested minimum enrolment of 250 to 300 pupils with favor for larger centers of 800 or 900 to a desirable maximum of 1200 students. Policy is expressed that there should be at least one good secondary school in each of the educational units being established which has an appropriate assessment to support a desirable program. Recognition of facilities for some

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[1] Section 182 (2) The Public Schools Act.

subject areas is dependent on enrolment as shown in the requirements for 130 secondary students for recognition for Home Economics, Industrial Education, or a Community Service Program.

The application for recognition of need must show past, current, and projected enrolments, some line drawing of existing facilities and desired ones as well as how it proposes to build. Discussions may culminate in some revised request. The minimum for approval is usually two classrooms. If entitlement warrants only one, a portable unit may be approved, particularly, in areas with temporary developments.

Approval is by the Planning Board of the Department which examines the total request having regard to the availability of funds or the possible freezing of debenture support for some facilities.[1] When the Department accepts the request for proposed accommodation and estimated costs, it will then, upon request, process a formal application from the board to authorize it to present a referendum to the ratepayers.

A referendum must be held and if approved by a 60 per cent majority, a certificate of approval may be issued after a 30-day waiting period, whereupon the board may confirm its bylaw. It may then retain an architect and submit preliminary sketch plans for approval. These must be in accordance with the referendum and include estimated cost, site conditions, and proposed development as well as possible expansion of the building.

After the preliminary approval is received, working drawings and specifications for use of provincial material and labor as well as specific standards and performance clauses are prepared for approval. Prime cost sums, except for sound systems, cannot be included in specifications unless previously approved by the Department. There is no provision for excess area as the board could not get authority to build unapproved area or levy for it in the approved budget. All extras, credits, or change orders must be approved.

Tenders cannot be called until the final plans, including working drawings and specifications, along with all tendering documents have been approved and financing has been assured. The time of tendering is considered important and the Departments generally decide the time for tendering.

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[1] For example, inadequate debenture funds meant that only 11 gymnasiums were built in 1970 with the result that over 100 were to be built the next year. Similarly, lunch rooms are not now recognized and cannot be built even on non-shareable costs; swimming pools are not currently approved either.

When received, the tenders are forwarded for approval, usually of the lowest one, after which a contract may be concluded.

The procedures indicate a detailed checking of all steps for the approval of space, plans, and tendering. Provision exists for considerable discussion between the Planning Branch and the school authorities.

ALBERTA

Each year school boards have been asked to indicate their expectations of capital construction and estimated costs for the next three years. A board must submit a particular building proposal to a provincial School Buildings Board for approval. The detailed application includes information about existing and desired facilities and about current enrolments and projected increases resulting from community growth or centralization. Abandoning schools or conveying some classes to another center may result in vacant rooms and request for accommodation elsewhere. Regulations indicate that Ministerial approval may be involved in such situations.[1] The board usually presents recommendations as well from any recent educational survey. The Coordinator of School Buildings may visit the area or consult with school board representatives. Attention is given to special conditions, urban planning, building permits, trends in development, and timing of such expected growth. The Buildings Board, will, upon examination of the data, deny[2] or approve the application or it may offer alternative proposals for the board's consideration. The principle is observed that, for a specified number of pupils, recognition should be given for an identified amount of instructional space plus related non-instructional area.[3]

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[1] 27(1) - A school board may dispose of, demolish, or otherwise cease to use, an existing school building, or part thereof, as a school only after receiving the approval of the Minister that this may be done. Upon receipt of such approval the school board shall obtain the ruling of the Board regarding any restriction of support of new construction by the School Foundation Program Fund as a consequence of this disposal.

[2] Non-approval of application prompts boards to revise their requests and occasionally to appeal to the Minister.

[3] Specifying minimal instructional space avoided reduction of such facilities in favor of non-instructional facilities.

The ratio may vary according to the size of the school or nature of an addition. When the recognition of need and appropriate facilities have been approved the board may present some sketch drawings and the Buildings Board will indicate the amount of financial support for which the proposal qualifies.

The board may retain an architect to prepare sketch plans and to proceed with working drawings and cost estimates. Except for a small project to be financed by a short-term loan, the board will advertise a bylaw for debenture borrowing for costs of the approved area, fees, equipment, and site development. If a plebiscite is requested a ballot vote must be held for the electors.[1] If there is no plebiscite or if a simple majority has favored a vote the board may then apply to the provincial Local Authorities Board for authority to borrow money by debenture. Having obtained approval for such borrowing, the board may secure assurance from the Department of Education that debenture funds will be available to it and indicate its proposals for financing any costs for which debentures are not provided before a tender is advertised.

Final plans and specifications must conform to building codes and have the approval of the Fire Commissioner before final approval is provided by the Department of Education.[2] Following this approval and that for borrowing, the board may advertise for tenders and submit its choice, usually the lowest one, for Ministerial approval after which a contract may be concluded. Subsequent change orders must have the approval of the Minister. After construction under the contract has commenced the board may request the Municipal Finance Corporation to make funds available in respect of the debentures it is eligible to issue.

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1. Electors include those over 18 years of age who may or may not own property.

2. Department approval of final plans is not required for the school systems of Edmonton and Calgary. Permits will eventually be required, usually after the contract is signed. in respect of the mechanical and electrical installations. The Department is not involved with these.

SASKATCHEWAN

In 1969, Saskatchewan established a Financial Management Branch that encompasses the functions of school finance and budget review, grants, statistics, and school facilities planning. Boards were asked to inform the Department soon about their long-range building needs. Their attention was directed toward pupil-loading and effective utilization of space.

A board's request for a particular project includes information about current and projected enrolments,[1] existing and desired facilities, and expectations concerning costs and financing. When the board secures preliminary approval of the Department it may retain an architect to prepare specifications and working drawings showing site conditions, floor plans, mechanical and electrical services and cost estimates for a proposed building. The statement should show revised cost estimates and plans for the total financing. Department approval follows that of the Fire Commissioner and the Department of Health. No tender can be advertised without this approval and plans cannot be changed without the consent of the Department.

The Department's approval is transmitted to the Local Government Board. The school board prepares a by-law and after compliance with any necessary requirements[2] submits it to the Local Government Board with its request to issue debentures.

When the required approvals are secured and debentures sold the board may then seek approval to tender the project.[3] The lowest tender is usually selected for approval; good reasons must be given for any other choice.

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[1] Conveying elementary pupils from another center may require approval. The Larger School Units Act was amended in 1971 to require departmental concurrence before a board may discontinue operation of a school in which pupils below Grade VIII are enrolled.

[2] If a plebiscite is required ratepayers only of the jurisdiction are entitled to vote. The Local Government Board shall be notified of the results of the poll; the Act specifies that "176A.-Where no application is made to quash a by-law within two months after...the by-law shall be valid and binding notwithstanding any want of substance therein or form thereof or in the proceedings respecting its submission to a vote." If a plebiscite is defeated the Minister may inquire into the need and may authorize the borrowing. (Sec. 152, The Schools Act.)

[3] The School Units Act, Sec. 81 states that it shall be the duty of every unit board "(3) to call for tenders before making a capital expenditure in excess of $5,000. for building materials..and before entering into a contract for the construction of a new school building or for the construction of an addition to an existing school, where the expenditure will exceed $5,000."

MANITOBA

A board's application or Notice of Intent in Manitoba for school construction includes information about school programs, predicted 5-year enrolments, existing accommodation, and educational specifications for desired facilities. The Department's initial approval is based on a minimum instructional area and a maximum gross building area. When it is given the board may retain an architect to prepare sketch plans and cost estimates to be approved after which detailed working drawings and specifications are submitted to the School Buildings Project Committee of the Department for further approval. The proposals are scrutinized carefully so that tenders may be comparable to the basic support price. After finalizing the specifications for acceptance the Committee recommends approval of the project by the Public Schools Finance Board. After this, tenders may be called and submitted to the Projects Review Committee. The school board is not obliged to accept the lowest tender but the amount of support is computed according to the lowest one. The tender is analyzed to determine the final approved costs and is then forwarded to the Finance Board. When approved the board may conclude a contract for construction and enact a bylaw for authorized borrowing to be arranged through the Finance Board.

ONTARIO

When seeking approval of a building proposal by the Ontario Department of Education, a board must submit formalized statements of need along with comprehensive information about desired facilities, enrolments for each, and pupil loading for shared space, as well as calculation of the existing accommodation units and those requested. The data should also show the nature of existing space including alterations, the educational programs, unsupported facilities, population trends, and projected enrolments. Similar data are requested for additions or renovations. Estimates of the gross area and approved cost including eligible costs for furniture and equipment should be prepared. This consolidated data are then submitted[1] for initial approval of the building project.

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[1] This formal request must be signed by the secretary or executive officer and by the regional inspector of schools.

Having secured the Department's initial approval, the board must then obtain any necessary tentative approval from the Ontario Municipal Board concerning the financing after which it may retain an architect to prepare sketch plans which in turn need Department approval after they have been endorsed by the school board. The plans must also be submitted to the Fire Commission and to the Water Resources commission as well as to the Departments of Health and of Energy and Resources for approval. Discussions may result in revisions but when the preliminary plans are approved, the Department issues a formal approval.

With this approval, the board may seek the preliminary approval of the Ontario Municipal Board for borrowing. It may also direct the preparation of working drawings and specifications suitable for tendering which must also be sent to the Department for approval before it gives the third or final approval for legislative grant purposes. This approval may expire after one year if the Ontario Municipal Board has not approved the desired borrowing or if debentures have not been sold. It may be renewed subject to new conditions at the time of renewal. Having secured the Department's final approval, the board then asks the Ontario Municipal Board for borrowing authority or requests the municipality to make application to that board if the municipality is responsible for the financing. After this, and when the sketch plans and cost estimates have been approved a bylaw may be passed for the borrowing and the Municipal Board notified accordingly. The bylaw does not have to be advertised and it is not subject to a plebiscite. The request for approval of the bylaw must show expected costs, any amount to be paid from current revenue, and the terms and amount desired through debentures.

The final approval of the Department will become effective when the board owns the site and the Fire Commissioner and other Departments have approved the proposals and the Ontario Municipal Board has authorized the borrowing.

Upon receipt of this final approval, the school board may call for tenders. The selected one must have the approval of the Department and the Ontario Municipal Board before a contract is concluded or before the board may sell debentures through the Ontario Education Capital Aid Corporation.

Debentures are for approved costs which is the total amount of money approved for the project.[1] A large share may be supported; favorable tenders may permit their full debt servicing. However, unsupported debentures are available for extra costs for the approved areas.

QUEBEC

In the construction procedures, the Department of Education, through its Directorate of Buildings and Equipment, has assumed much control in respect of plans and specifications for schools proposed by school boards. This control is continuous from the initial request to the completion of the project which in itself must be approved by the Department. In supervising the implementation of the authorized plans, the Directorate must satisfy itself that the projects conform to the building standards of the Department and are carried forward at the lowest possible cost.[2] It also coordinates all purchases of school furniture and equipment. Requests for much of this must be approved before tenders are invited from those who have government approval to tender.

Instructions to local and regional boards[3] assert that all school boards which are planning to construct, extend, or renovate a school building are required to comply with qualitative and quantitative norms established by the Buildings and Equipment Branch. Many of these are enunciated after consultation with the Director of Elementary and Secondary Education about educational specifications needed. They are specified in the regulations regarding the nature of the facilities. A comprehensive

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1. A figure is established as the approved cost which includes the tender price, fees, a scheduled contingency sum, and maximum allowances for furniture and equipment as well as a possible allowance for unusual conditions. It does not include costs for any demolition nor for excess area as that cannot be provided. The tender may be well below the approved cost figure so that the amount of supported debentures of 90% of the approved cost may apply to what would otherwise have been locally supported.

2. Annual Report of the Department of Education, 1969-70, p. 10.

3. Administrative Manual for School Boards; Material Management Section, March 9, 1971. Order-in-Council 2380.

set of directives[1] is issued concerning the procedures and documents to be used for securing the many sequential approvals which are required.

A board first seeks approval by the Department of its resolution to build. Its application shows educational specifications in respect of classes, rooms, laboratories, workshops, and other desired facilities. The Directorate of Buildings and Equipment itemizes the areas for the accepted specifications according to a standard technical program. This acknowledgement may serve as an initial recognition of need. However, the developments thereafter must have three successive approvals of preliminary sketches, working drawings, and of final plans after any directives have beenobserved. Educational specifications may need to be reduced as excess area is not approved and there is no provision of funds for costs beyond the approved budgetary estimate.

After the approval of the working drawings and cost estimates, the school authority may call for tenders in the prescribed manner.[2] The lowest tender selected must ultimately be approved by the Minister. These procedures may suffice for minor capital expenditures but further procedures must be observed for financing large projects that require receipt of grants or long-term borrowing.

A resolution for borrowing in excess of one thousand dollars must be advertised.[3] If there is no protest or else a favorable plebiscite[4] the board shall submit a request to the Department and to the Quebec Municipal Commission to secure approval of any grants and the authority to borrow. This approval is necessary as well as those of the Ministers of Education and of Municipal Affairs.

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[1] The Directives focus attention on general concepts, procedures, site location and soil conditions, normalized construction budget, and architectural and construction norms. The statements on structure pertain to mechanical, electrical, and communication services as well as to the nature of other facilities.

Directives are also issued on other matters associated with the construction. For example, publicity on a comprehensive school building requires that a sign must be erected on the construction site indicating the school is being constructed through the cooperation of the board, the provincial government, and the federal government for parts of the vocational costs; the amounts of the contributions must be specified on the sign.

[2] O/C 2380 prescribes the manner and procedures in respect of tendering.

[3] Section 312, Education Department Act, 1964.

[4] Electors are property owners or the spouse, or father or mother of the property owner, or a tutor of his children under 18 years of age; Sec. 99, Education Act, 1964.

After the approvals, the board may then conclude a contract for school construction.[1]

Debenture funds will be available for the approved cost but any excess costs must be paid from the current budget as no debentures are available for them. The Municipal Commission arranges the actual floating of the debentures in cooperation with the Department of Education.[2]

NOVA SCOTIA

In seeking approval of a building project in Nova Scotia the school board will provide information about the attendance area, the expected enrolment of the grades involved, the nature of the proposed program, and the desired facilities as well as data about existing accommodation. An estimate of cost should be included. It should also explain its proposal to the municipal council which may seek tentative approval for construction from the Department of Municipal Affairs.

After the school board has received the necessary Department approval, arrangements may proceed with the Municipal Council for construction.[3] An architect may be retained to prepare preliminary plans which must be approved by the Director of School Planning in the Department of Education. There will be recurring need of consultation between the school board and the municipal council. In practice, the school board attends to the building details. During the same time the council may pursue arrangements for borrowing and securing approval of the financing from the Department of Municipal Affairs. After approval of the preliminary plans, working drawings and specifications are prepared for tendering and all these along with tender documents are sent to the Director of Planning who arranges for their approval by the different government departments concerned. The Department of Public Works is represented at the meeting of the council when tenders are opened.

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1. In cases of extreme urgency the board may send its borrowing resolution and notice of no protest to the Minister with a request that he may authorize earlier commencement of building.

2. No school corporation may sell bonds in excess of $3,000 otherwise than by public tender.

3. Construction is responsibility of the council according to the Municipal Act (Sec. 224) except in amalgamated school district areas. However, the council usually asks the school board to arrange the details for the building. Some, as in Halifax, pursue all arrangements themselves.

   If cost is to be $60,000 or more an architect must be retained-Architects' Act, R.C.1967 Ch. 13, Sec. 25. The contract with architect must be approved by Department of Public Works.

The accepted tender is approved by that Department. Acceptance of the lowest tender is not legally required although it becomes the basis of the approved cost. The additional expenses of a higher one become part of the non-shareable costs to be paid locally.

The Department of Public Works also must approve the contract for construction and make periodic inspections indicating the adequacy of the work. Upon completion the various departments make an inspection after which final approval may be given and the total financial support determined for the building and for the furnishings and equipment. The Council will have proceeded with the sale of some debentures not financed through the Municipal Loan Fund.

Amalgamated school boards may carry out the duties that municipal councils would do where there is no amalgamated school area.

NEW BRUNSWICK

In New Brunswick a local planning committee comprised chiefly of teachers prepares educational specifications for desired facilities. These become part of the request submitted by the local school board. When the Department gives approval of the request it may then appoint an architect[1] to work with the school board in preparing preliminary plans. Suggested guidelines concerning programs and facilities have been prepared by the Director of Planning in consultation with curriculum personnel. The educational specifications of the preliminary plans must be approved before working drawings are commenced. After final plans are approved they are sent to the Department of Public Works for the construction arrangements.[2] There is no further involvement of the school board as any change orders are processed by the Public Works Department and no bylaw is needed as the school board does not incur capital indebtedness.[3] Some of the buildings may be constructed in two stages out of regard for the availability of funds.

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1. The district may suggest certain architects, but the Department appoints one.

2. The involvement of the Department of Public Works is to be discontinued soon with the expectation that the Department of Education will carry out the building arrangements.

3. Special supplementary features beyond the approved building may result in local tax requirements.

PRINCE EDWARD ISLAND

New legislation and school organization have changed procedures for capital construction. Until recently a board in this province needed preliminary approval of its request by the Department before it could retain an architect. Henceforth, it may still indicate its desires and after approval is given for the educational specifications, the Department of Public Works will retain architectural services from a consortium of the four existing firms. This organization promotes a common interest in design for schools.

The Departments of Education, Development, and Public Works all participate in the continued planning stages as well as the Federal Department of Economic Expansion where D.R.E.E. funds are involved. There is no current approval of a supplementary capital expenditure to be paid for from a local tax levy according to statutory provisions. After all plans have been finalized the Department of Public Works calls for tenders and directs the construction. There is leeway of from 1 - 5 per cent permitted to resident firms of the Province.

When the building is finished the whole project is turned over to the ownership of the regional school board. Consultations are held with boards about furniture and equipment which is listed for approval.

NEWFOUNDLAND

School authorities may indicate desire for a school and specifications for it. There will be need of approval of some allocation of funds for it from the Denominational Educational Committee which applies the allocated capital grant. A guidebook of planning directives is being prepared for school boards. Some of its specifications may correspond to those currently being used where D.R.E.E. funds are involved. Final construction plans must be in accordance with the National Building Code and requirements of the Health Authorities and Fire Commissioner. They may then be submitted for the approval of the Departments of Education and of Public Works.

Thus, approval is required concerning the need for a school, the plans and specifications for it, and the amount of cash grant allowable before a school authority may proceed with its construction.

SUMMARY

All approvals for facilities are based on boards' requests showing information about enrolments, facilities, and school programs. All provinces approve the plans and many control the specifications as well to establish approved costs for which assistance is expected. Municipal approvals are involved in some Eastern provinces and in two of them the governments arrange for the construction and pay the costs. In the rest, boards must have approval for the tenders and may have to reduce the specifications or, if permitted, pay excess costs. A comparative overview is indicated below:

	British Columbia	Alberta	Sask.	Man.	Ontario	Quebec	N. B.	N. S.	P.E. I.	.Newf.
Approval of need	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Approval of:							After recognition of facilities the government engages architect to prepare plans; government tenders and finances the costs except for supplementary area paid for locally. No debentures.			
-Sketch plans	yes	yes	yes	yes	yes	yes		yes		yes
-working Drawings	yes	some*	yes	yes	yes	yes				
-specifications	yes	no	yes	yes	no	yes				
-Final plans	yes	yes*	yes	yes	yes	yes		yes		yes
-change orders	yes	yes	yes	yes	yes	yes				
- cost Estimates	yes	no	yes	yes	no	yes				yes
Government rules on inadequate, excess, or unapproved space	yes	yes	yes	yes	yes	yes		yes		After approval of plans and expected costs the government makes a grant not to exceed 90% of the approved costs. - No debentures.
Approval for preparing:										
-bylaw										
- Department	yes	no	no	n0	no	no				
-Municipal District								yes		
-referendum	yes	no							.Same as for New Brunswick.	
Approval of:										
-Bylaw to borrow	yes	yes	yes	yes	yes	yes		yes		
-tendering time	yes	no	no	no	no	yes				
-tenders										
(a) Educ. Dept.	yes	yes	yes	yes		yes				
(b) Mun.. Dept. or Mun. Board					yes			yes		
-contract	yes	yes	yes	yes	yes			yes		
Excess costs for approved area over approved support.	limited			None allowed		limited				
Debentures-Unsupported	yes	yes	limited		yes	yes		yes		
Excess area -										
-allowed -debentured (unsupported)	no no	yes no	from current revenue if app.	None allowed	yes	None	None exc. sup.		None exc. sup.	
Government arranges construction							yes		yes	

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*Final plans do not have to be approved for Calgary and Edmonton.

CHAPTER IV

NATURE AND SIZE OF FACILITIES

The types and extent of educational facilities are important in the educational process. Approval of them imposes a significant commitment of public funds to provide needed accommodation for accepted programs. Each province has developed concepts and regulations concerning school construction according to grade levels of recognized enrolments, curriculum, and costs. All of them are related to some degree of central control. The ensuing review of practices reveals the policy in each province for approving facilities for which public support is granted.

BRITISH COLUMBIA

A School Building Manual of the British Columbia Department of Education specifies the nature and size of school facilities. The basic classroom is considered a Teacher Entitlement Unit (T.E.U.). Effort is consistent to construct larger schools to reduce the duplication of service areas. Schools are sized for about 35 per classroom in the elementary and 30 in the secondary schools. Space per pupil is about 70 sq. ft. in the elementary schools and about 100 in the senior secondary; the figure is about 90 in the junior secondary. This would apply in one of about 500 pupils although there is favor for schools to accommodate 1000 students.

There are many regulations in accordance with the National Building Code, Health Regulations, and other specifications about service systems such as plumbing, heating and ventilation, illumination, fire alarm systems, electrical switches and convenience outlets. Further directives pertain to limited sound systems, number of telephones, and some bell signalling system and synchronous clocks. Some items such as intercommunication telephone systems are not approved for support. Limitations for shareable costs are set on the nature and size of blackboards, cupboards, storage, sinks, and counter units for the laboratory and growing areas. Services and specifications for Industrial Education are stipulated and plans are provided for furniture and equipment layouts. Items of equipment and furniture for Home Economics and Community Food Services are also specified. The directives concerning the nature and extent of equipment are significant to the overall cost that is approved for shared support.

Many other directives pertain to ceiling heights, width or corridors, stairways, ramps, and exterior doors. Planning the facilities for convenience in community use is encouraged by suggestions such as providing direct access from the outside to the auditorium and gymnasium and their service areas as well as to the cafeteria units. It is suggested that designing should permit heating and lighting of certain areas independently of others. However, the directives state that extra costs for community facilities are to be avoided. It is also asserted that buildings should be planned for later additions or modifications as a well-constructed frame building should serve for over fifty years. Classrooms are usually sized at 768 sq. ft.; larger areas for kindergarten classes have been approved in about twenty schools. Another special feature is the lunchrooms in schools exceeding 394 pupils. Space for special education has been provided in a few schools. Elementary schools with Grade VII usually include showers with activity rooms and sometimes kitchens as well. Full gymnasiums require a minimum enrolment of 1500[1] pupils; other significant features are courtyards, the roof-covers for play areas, and the bleachers in the senior schools. The type and size of many facilities with related information are shown in the following charts.

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[1] Area larger than that approved for an activity room or gymnasium would be considered non shareable cost and would require a favorable referendum and subsequent approval to spend the funds.

SPECIAL ROOMS

ACTIVITY ROOM
plus stage (448 sq. ft.)
and possible kitchen (150 sq. ft.)

ELEMENTARY SCHOOLS	STANDARD CLASSROOM	STORAGE & CLOAKROOM if approved	PRIMARY MAXIMUM if work area included	KINDER-GARTEN	& WASHROOM	ART ROOM (home room) over 12 rooms	LIBRARY (incl. work room) - over 2 rooms varied acod. to chart, below:	4-8 T.E.U.	STORAGE	9-12 T.E.U.	STORAGE	SHOWERS
(28' width recommended) 35 pupils per room A classroom is counted as a T.E.U.	sq. ft. 768 Up To 784	sq. ft. 110	sq. ft. 895	sq. ft. 896	+ sq. ft. 112	sq. ft. 895	pupils sq. ft. 67 - 358 - 784 359 - 574 - 1456 575 - 718 - 1792 Beyond - about 2½ sq. ft. per pupil	sq. ft. 1800	sq. ft. 200	sq. ft. 3600	sq. ft. 400	sq. ft. 2 (576)

Special conditions in very large schools may warrant approval of greater area.

TEU	ENROLMENT	KINDERGARTEN ENROLMENT	APPROVED MAX. LIBRARY AREA		APPROVED LUNCHROOM AREA	APPROVED ADMINISTRATION AREA
1	10 - 25	25 - 60.	0		Special Luncheon Area Not Approved	
2	26 - 66	61 - 120	0			300
3	67 - 106	121 - 180	784	Sink Cabinet Only		500
4	107 - 142	181 - 240	784			600
5	143 - 178	241 - 300	784			700
6	179 - 214		784			800
7	215 - 250		784			1100
8	251 - 286		784			1100
9	287 - 322		784			1100
10	323 - 358		784			1100
11	359 - 394		1456	Separate Book Repair or Storage Room Must Be Incorporated Within Areas Shown		1100
12	395 - 430		1456		1430	1100
13	431 - 466		1456		1550	1400
14	467 - 502		1456		1670	1500
15	503 - 538		1456		1790	1600
16	539 - 574		1456		1910	1700
17	575 - 610		1792		2030	1800
18	611 - 646		1792		2150	1900
19	647 - 682		1792		2270	2000
20	683 - 718		1792		2390	2100
21	719 - 754		1885		2510	2200
22	755 - 790		1975		2630	2300
23	791 - 826		2065		2750	2400
24	827 - 862		2155		2870	2500
25	863 - 898		2245		2990	2600
26	899 - 934		2335		3110	2700
27	935 - 970		2425		3230	2800
28	971 - 1006		2515		3350	2900

ADMINISTRATION AREA
acod. to schedule
offices, staff room,
medical room, janitor
storage, & book storage

	sq. ft.
2 - 12 T.E.U. -	300 Up To 1400

Over 13 rooms - 100 sq. ft. for each T.E.U.

eg:-
28 rooms - 2900 sq. ft.
Total area must not be exceeded.

SICK ROOM

Rooms		sq. ft.
7 - 12	-	1 @ 72
Over 12	-	2 @ 72

Roof Only For
Approved Covered
Area by Schedule
if reported on
referendum

	sq. ft. Min.	Max.
2 rooms Up To 9 rooms	1000	Up To 2000

Plus 100 sq. ft. for each T.E.U. Permanent type covered-play areas should be constructed for each 6 T.E.U. block or wing.

SPECIAL ROOMS

HIGH SCHOOLS
J.H.S. INCLUDES VIII, IX, X

Based on 30 pupils per room

All special rooms are included as instructional areas with some provisos :

- Each Industrial Education Shop and Occupational T.E.U. is counted as two-thirds of a teaching area.
- Home Economics and Community Service rooms are counted four-fifths of a teaching area.

Thus libraries, laboratories, art or music rooms serve a multi-purpose function to ensure full time use of instructional space. They must be planned to be used as standard T.E.U.'s. The science laboratory may have a growing space or greenhouse area to be counted as a T.E.U.- otherwise it is considered four-fifths of a T.E.U.

Risers or terraces not considered necessary unless room is used full time for choral or instrumental work.

STANDARD T.E.U. CLASSROOM INCLUDES STORAGE AND SHELVING

sq. ft.

Min. - Max.
758 784

Up To 784

ART ROOM (INCLUDING SINKS)

No. of Pupils	No. of Rooms	Area sq. ft.	Storage Area sq. ft.
To 600	1 -	784	224
600 - 1500	1 - 1 -	784 896	224
Over 1500	2 - 1 -	784 896	224 224

MUSIC (INCLUDING STORAGE)

No. of Pupils		sq. ft.
Up To 300	-	1008
300 - 900	-	1344
Over 900 (2 rooms) for		2352

No terraces unless full time music use.

LIBRARY PLANNED FOR USE AS T.E.U.

Area according to approval; not less than $2\frac{1}{2}$ sq. ft. per student enrolment plus seminar rooms

Must be workroom, sink and work table

COMMERCIAL PROGRAM JUNIOR OR SENIOR H.S.

No. of Pupils		No. of Rooms	sq. ft.
130 - 150	-	1 @	1120
251 - 500	-	2 @	895
501 - 750	-	3 @	896
Over 750	-	4 @	895

SCIENCE LAB. (MULTI-PURPOSE)
1 - for each 150 pupils

Lab. Area sq. ft.	Growing Area sq. ft.
1232	672

Plans are provided for furniture layout.

1 T.E.U. for each if growing area included which may be for 2 labs.

HOME ECONOMICS

No. of Pupils				No. of Rooms	Area sq. ft.
130	-	300	-	2 @	1792
Combination Rooms					
601	-	900	-	1 @ 2 @	1492 1400
901	-	1800	-	4 @	1400
1200	-	1800	-	1 @ Combination 4 @	1792 1400
Over		1800	-	6 @	1400

All are 1400 sq. ft. except the combination all-purpose room at 1792 sq. ft.

COMMUNITY SERVICES
ALL HIGH SCHOOLS
24 pupil-groups

Facilities		Area
Clothing, Textiles and Food Rooms each	-	1400
Combined Room	-	1864
Home Management	-	420

Number of facilities approved according to enrolment.

TEACHING CAFETERIA - KITCHEN
Option for Grades XI and XII in schools over 600 enrolment

Area		Area
1180	+	490 Auxillary Needs

Should serve as option for Foods 12B and for school food services.

Equipment lists provided for approval. The figure may approximate $4000.

CAFETERIA
ASSOCIATED WITH TEACHING CAFETERIA - KITCHEN
Over 600 senior students

1/3 school

10 sq. ft. times 1/3 of enrolment.

(900 pupils - 3000 sq. ft.)
+ staff dining area

	GYMNASIUM-AUDITORIUM Up to 1500 pupils				SUPPLEMENTARY SPACE 50' x 80' (if approved)	STAGE -recommended for secondary schools - no dressing rooms	STORAGE AREA chairs, uniforms gym, and field equipment	SHOWERS AND DRESSING ROOMS to accommodate groups of 40 pupils	BLEACHER accommodation - permanent or folding	
	No. of Pupils	Dimensions	One-Station Area sq. ft.	Two-Station Area sq. ft.		Area sq. ft.	Area sq. ft.		Enrolment	Seating For
I Elementary and Secondary Schools	100 - 300	40.6' x 67.5'	2733			440	440	Up To 1200 Pupils - 2 @ 1000 + 50 sq. ft. per 100 tote baskets	Up to 600	- 50% of enrolment
	301 - 600	67.6' x 81.0'	5467			672				
	601 - 1200	67.6' x 81.0'		6345		672	596			
	1201 - 1800	67.6' x 81.0'		10345 +	1 @ 4000	672				
	1801 - 2400	67.6' x 81.0'		10345 +	2 @ 4000	672	640	Over 1200 - 2 @ 1200	Over 600	- 300 places plus 1/3 of enrolment over 600
II Junior & Senior High Schools	100 - 180	54.0' x 67.6'	3645			440				
	181 - 300	67.6' x 81.0'	5467							
	301 - 600	67.6' x 94.5'	6345			672	440			
	601 - 1200	81.0' x 94.6'				728	592			
	1201 - 1800	81.0' x 94.6'		7654 +	1 @ 4000	728	640			
	1801 - 2400	94.6' x 94.6'		8883 +	2 @ 4000	874	640			

design for convenience for:

(1) gym and playground
(2) stage, if possible
(3) future expansion

Gymnasiums:

- used as auditoriums as well
- must be designed for future addition
- an auditorium may be approved if enrolment exceeds 1500 pupils
- for community use a ticket booth may be provided. An exterior entrance is not provided.

The approved size and allocation of administration for various types of schools are given in the table below:-

	GENERAL SPACE & WAITING AREA	PRINCIPAL	COUNSELLORS	VICE-PRIN.	MIMEOGRAPH & SUPPLY	MEDICAL	STAFF-ROOMS	BOOK STORAGE	P.A. BOOTHS	TICKET -BOOTH	STUDENT COUNCIL & PUBLICATION ROOM	STAFF OFFICES (120 sq. ft. each)	TOTAL SQUARE FEET
	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	
Under 300	192	100	64	—	64	200	300	250	24	—	—	—	1,194
301 - 600	416	120	128	80	64	250	460	500	36	24	225	—	2,303
600 - 900	560	140	192	80	80	300	660	750	36	24	300	—	3,122
901 - 1,200	625	160	256	100	80	350	840	1000	48	24	375	1 - 120	3,978
1,201 - 1,500	675	180	320	100	100	400	1020	1200	48	36	450	2 - 240	4,769
1,501 - 1,800	720	200	384	120	100	450	1200	1500	64	36	525	4 - 480	5,779
1,801 - 2,100	750	220	448	120	120	500	1300	1800	64	36	600	7 - 840	6,798

INDUSTRIAL EDUCATION

24 in pupil-groups

		JUNIOR HIGH SCHOOL		SENIOR HIGH SCHOOL			
No. of Pupils		No. of Facilities	Sq. Ft.	No of Facilities		Sq. Ft.	
130 - 200	-	1 or 2	2376 1944	2	-	4032	Plus 700 sq. ft. area covered and fenced.
251 - 500	-	2	5760	4	-	7032	
501 - 750	-	3	5256	5	-	9672	
751 - 1000	-	4	6696	Enlarge for each additional 250 pupils -			

For Technical-Vocational facilities, approved space has been provided for accepted programs in the majority of regular high schools. These are apart from the provincial vocational schools, some of which have been integrated with the public community colleges. There has been interest for associating technical courses with the Junior Colleges.

ALBERTA

Regulations in Alberta specify the size and nature of facilities in respect of instructional area and of non-instructional space which is not expected to exceed two-thirds of the former. Many spaces are generally sized for 30-pupil groups with small numbers acknowledged for some facilities. Spaces are not supported for kindergarten or pre-school classes.[1]

Schools are classified according to size by enrolment and grade levels. These classifications conform largely to possible curriculum development. On the basis of such classification and recognized enrolments the number of classrooms is determined and different sized areas are approved accordingly for libraries, gymnasiums, stages, science rooms, cafeteria-study halls, or administrative space.

Classrooms are 750 sq. ft. Elementary science rooms may have an additional 250 sq. ft. for equipment repository or for a larger classroom. Junior and High school laboratories are 1,300 sq. ft., all inclusive. The laboratories are considered home-rooms. Special ancillary rooms of varying sizes according to enrolment are approved as specialized space for instruction in art, music, dramatics, team teaching, commercial electives, or other special fields. Home Economics rooms start at 1,400 sq. ft.; a first addition to one may have a further 1,000 sq. ft. Industrial arts spaces may range from 2,800 or 3,200 sq. ft. to 4,000 or up to 8,000 for four-station shops in large secondary schools. Space is also provided for schools having sufficient enrolments to warrant business education and technical programs on a vocational school basis.[2] Single station gymnasiums vary from minimums of 2,400 sq. ft. in a small elementary school, 4,000 in a junior high, or 5,400 in a secondary school. Larger size or more stations will depend on the enrolment. Showers and dressing rooms, stages, and physical education offices are approved. An activity room of 1,600 sq. ft. may be provided instead of a gymnasium in small elementary schools or as auxiliary physical education area.

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[1] However, the entrance age has been accepted 5.6 years with consideration of this figure being lowered. Some vacant classrooms or renovated basement rooms have been used for kindergarten classes.

[2] Vocational education was incorporated in the regular high schools. For these programs the federal and provincial government shared the total cost of accommodation and approved equipment. After the withdrawal of the quota for federal assistance the province assumed continuing debenture support for further facilities.

In addition to these various teaching stations, libraries are approved from 3 - 3½ sq. ft. per student. Study room-cafeterias are approved in high schools of over 700 students from large attendance areas where the majority will be remaining at the school for lunch. Auditoriums are not approved separately as gymnasiums or auxiliary ones usually serve the purpose. Space may also be provided for special handicapped classes or for special courses approved by the associate Deputy Minister. Administrative areas include space for office, counselling services, staff lounge and work room, infirmaries, and storage. Facilities must be planned for future expansion. Portables are recognized for 750 sq. ft. or 1,000 if self-contained. A few relocatable gymnasiums have also been recognized.

The approved instructional and non-instructional space comprise a recognized gross area which averages about 77 sq. ft. per pupil in small elementary schools about 70 sq. ft. in the larger ones. The figure in small junior high schools is about 107 sq. ft. and in the larger ones over 18 rooms about 95 sq. ft. per pupil. Small high schools of about 300-400 pupils have about 115 sq. ft. per student and those of 750-100 students are averaging about 100 sq. ft. while the largest ones show a range of 90 to 100 sq. ft. Spaces are larger for those with technical-vocational facilities.

Freedom to redistribute the recognized instructional space permits some of it to be used as enlargement of particular areas such as incorporating the space of two classrooms with the library in a large open area. In the open area, sections that would otherwise provide corridors are included in the instructional area. Significant features include extensive carpeting of open areas in many schools, many specially developed instructional areas, attractive offices, and effective services for ventilation or air-conditioning. Areas beyond the acknowledged size are not approved nor are debenture funds available for the cost.

The following charts summarize the approved areas and related information. Supplentary charts show implementation on a concept of a school plant and examples of applications of it to elementary, junior, or senior high schools.

The Board, in considering need for space in schools, will normally consider a proposed project to come under one of four categories:[1]

Category A: Senior high schools of 250 students or more, junior-senor high schools of 350 students or more and of which at least 150 students are in Grade X or above, or schools of 450 students or more in the range of Grades I to XII of which 150 or more are in Grade X or above.

Category B: A school having at least a total enrolment of 200 pupils, of which 100 pupils or more are enrolled in Grade VII or above.

Category C: A school of 150 pupils or more which does not meet those requirements of Categories A or B.

Category D: A school of less than 150 pupils.

Nature of Facilities (By Regulations)	No. of Facilities	Sq. Ft. Min.	Max.	
Classrooms				
-all schools			750	
Science laboratory				
-counted as home rooms				
-Elementary (IV, V, VI)				
1 per 7 classes	1+		1000	storage included
-Junior High VII - IX				
1 per 7 classes	1+		1300	storage included
-Senior high X - XII				
1 per 6 classes	1+		1300	storage included
Ancillary Rooms				
Not home-rooms; supplementary for special subjects- art, music, dramatics audio visual, etc. commercial elective.				
Category A	3 @ 1000	3000		
300-600 pupils	4 @ 1000		4000	One may be used as a language lab
600-800 pupils	5 @ 1000		5000	
800-1200 pupils	6 @ 1000		6000	
over 1200 + 5 sq. ft. per pupil	+ @ 1000		+	
Category B and C				
200-400 pupils	1		1000	
600-800 pupils	3 @ 1000		3000	
over 800 -100 pupils	4		4000	
A Category B having over 100 senior high school students may qualify for another	1 @ 750		750	
(Spaces may be divided according to local planning)	1		900	
Category C				
150 -200 pupils				
1 combined with library	1		900	
Category D				
100-150 pupils	1		750	
Language Laboratory				
1 ancillary room may be used as Language lab in senior high school of over 300 pupils.				

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[1] Building Regulations, Section 32.

Libraries

Basically 3½ sq. ft. per pupil in high schools; 3 sq. ft. in elementary schools.

Category	Enrolment	Sq. Ft.
A		*1,500
	350 - 500	*1,800
	500 - 700	2,100
	700 - 900	2,800
	900 - 1,100	3,500
	1,100 - 1,300	4,200
	1,300 - 1,500	4,900
B & C	200 - 350	* 900
	350 - 500	*1,500
	500 - 700	1,800
	700 - 900	2,400
	900 - 1,200	3,200
	1,200 - 1,500	4,000

Library may be next to ancillary space to provide for supplementary use or future expansion.

Combined library ancillary rooms are recognized in smaller schools.

The areas are inclusive of space for workrooms, seminar, or carrells.

Home Economics	No. of Facilities	Sq. Ft. Min.	Sq. Ft. Max.
Approved according to school program and minimum of 60% use.			
-Multi purpose room			
Single	According to enrolment		1,400
Double			2,400
Triple			3,800
Quadruple			4,800

Industrial Arts	No. of Facilities	Sq. Ft. Min.	Sq. Ft. Max.
-Junior High			
Single	According to enrolment		2,800
Double			4,000
-Junior - Senior			
Single			3,200
Double			4,000
-Senior High School			
Single			3,200
Double			4.400
Triple			6,200
4-station			8,000

Specific size, and design are subject to recommendation of Provincial Supervisor

Physical Education Facilities

	Stations	Phys. Ed. Floor Sq. Ft.	Phys. Ed. Storage	Stage May have an ancill-ary room instead	Dressing Room Sq. Ft.	Showers Sq. Ft.	Maximum Dressing & Showers Sq. Ft.	Phys. Ed. Offices @ 120 Sq. Ft.
Cateory A 80' width and 22' ceiling pro-vision for a divider	1 double	5,040	200	1,000	600-700	300-400	1,000	1
	2	7,200	+100	-	-	-	-	+1
	3	10,800	+100	-	+300-350	+150-200	+500	+1
	4	14,400	+100	-	+300-350	+150-200	+500	+1
Category B 20' ceiling 60' width for double. 50' width for single.	1	4,000h	200	800	500-600	300-400	900	1
	2	4,800	+100	-	-	-	-	+1
	3	7,200	+100	-	+250-300	+150-200	+450	-
	4	9,600	+100	-	+250-300	+150-200	+450	-
Category C 18' ceiling	1f	2,400	200	800				1
	2	3,840	+100	-				-
	3	5,760	+100	-				+1
	4	7,680	+100	-				-
				-				

Category D

Four rooms or more may not qualify for a gymnasium but may have approval of multi-purpose activity room of 1600 sq. ft. This may serve later as two classrooms if enrolment growth later warrants a gymnasium . Such a room may also be recongized for a category C school rather than a new addition to the gym.

Double station gyms may be initially recognized in high schools using the space over 60% of the time and extensive community use is anticipated.

Administration

No of Rooms	Principal Sq. Ft.	Vice Principal - Sq. Ft.	Counselling Rooms - Sq. Ft.	General Office Up To	Conference Rooms	Staff Lounge Sq. Ft.	Staff Work Room Sq. Ft.	Washrooms Sq. Ft.		Infirmary Sq. Ft.	Cafeteria-Study Hall Sq. Ft.
								M	F		
5- 7	180	0	0	Two thirds of approved space in columns at the left		250	0 0	40	60	1 @ 275	10 times 1/3 of enrolment for senior high school of over 700 pupils
8-15		150	1 @ 120			350	200	40	60		
16-20		150	2 @ 120			450	400	40	60	2 Or more @ 275 each	
21-25		No as organization reg.	One more for each additional rooms			550	600	80	120		
26-35						600	800	80	120		
over 35						650 +17 or +25 per extra person	1000	80	120		

Other area for storage, lavatories, mechanical rooms, etc. as deemed necessary within the limits of non-instructional space up to two-thirds of the instructional area as is essential.

Vocational Education Facilities

Facilities are recognized for business education in senior high schools of 400 or more students and for technical vocational having 700 or more students.

-Business Education - recognized for senior high schools of over 400 schools

No. of Pupils	Facilities Counted As Home Rooms	In New School Sq. Ft.	In Addition
100-125	1 Typing	1,200	
	1 Multi-Purpose Lab.	2,000	
	1 Merchandising	1,200	
125-175	1 Typing (Manual)	1,200	Reclassify Multi-purp. to Bus. Mach. & Off. Pract. and 1 Typ. Elec.(+pt. Steno) 1,200 Sq. Ft.
	1 Typing (Electric & Steno)	1,200	
	1 Business Mach. & Off. Pract.	2,000	
	1 Merchandising	1,200	
175-225	1 Typing (Manual)	1,200	Reclassify Bus. Mach. & Office Pract. to Office Prac. Add Bus. Mach 1,00 Sq. Ft.
	1 Typing (Electric & Steno)	1,200	
	1 Office Practice	1,500	
	1 Business Machines	1,200	
	1 Merchandising	1,200	
225-325	2 Typing (Manual)	1,200	
	1 Typing (Electric & Steno)	1,200	Add 1 Typing (Manuel) 1,200 Sq. Ft.
	1 Office Practice	1,500	
	1 Business Machines	1,200	
	1 Merchandising	1,200	
325-425	2 Typing (Manual)	1,200	
	1 Typing (Electric & Steno)	1,200	Add 1 Typing (Electric) 1,200 Sq. Ft.
	1 Typing (Electric)	1,200	
	1 Office Practice	1,500	
	1 Business Machines	1,200	
	1 Merchandising	1,200	
425-500	Add 1 Typing (Manual) - add either	1,200	
	Business Machines or Office Pract.	1,200	

The facilities may be combined or arranged according to local planning.

-Technical Vocation - recognized for approved programs in senior high schools of over 700 students. No recognitions have been given for some time pending reorganization of programs.

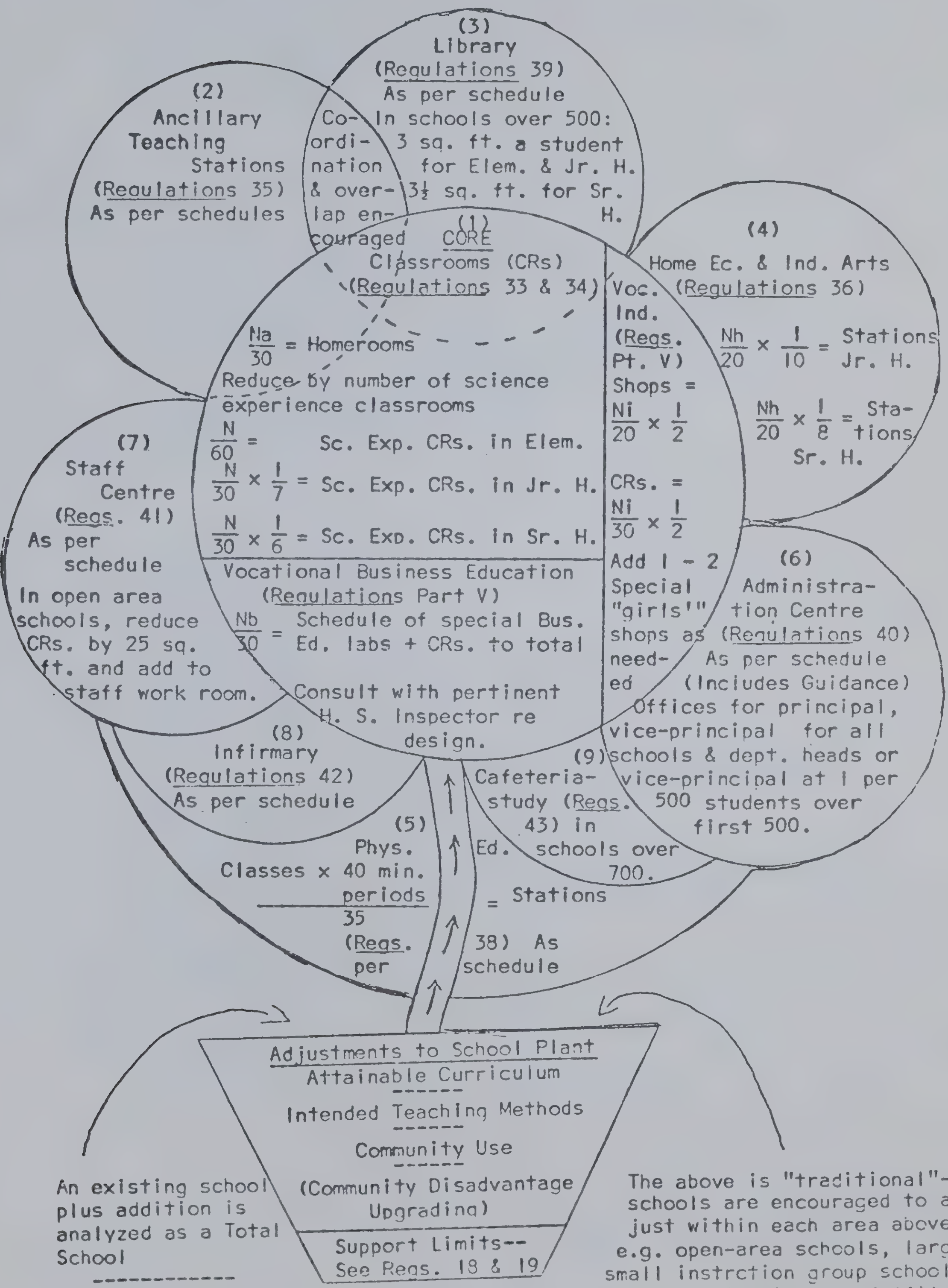
Normally, and inclusive of all related areas, maximum size will not exceed those listed below. Where, however, larger enrolments than 4 are planned the sizes indicated in parentheses may become the maximums. For enrolments below 17, lesser sizes may be recognized.

		Suggested Areas Up To: Sq. Ft.	
Auto Mechanics	single	4,500	(5,000)
Auto Mechanics	double-junior	4,000	(4,500)
Auto Mechanics	-senior	3,000	(3,500)
Auto Body		4,000	
Building Construction		4,000	(4,500)
Ag. Mechanics		3,500	(4,500)
Pipe Trades		3,000	(3,500)
Machine Shop		2,500	
Electricity		2,000	(2,500)
Sheet Metal		2,000	(2,500)
Welding		1,500	(2,000)
Beauty Culture	single	2,000	
Beauty Culture	double	2,800	(3,000)
Food Production --	Teaching Kitchen	3,000	
Food Production --	Teaching Lab.	1,400	
Commercial Art	Single	1,800	
Commercial Art	double	3,000	
Drafting	single	1,400	
Drafting	double	2,500	
Electronics		2,000	
Receiving and Central Storage	from	500 to 2,000	

The Nature of these vocational facilities, reflect (largely influenced by) federal-provincial planning when a vocational program was implemented in 1961. Since discontinuance of the federal support Alberta carried forward the services with some reductions of the space and support for facilities.

THE SCHOOL PLANT: A CONCEPT

It is basically composed of 9 areas of activity as shown in the overlapping circles.


(3)
Library
(Regulations 39)
As per schedule
In schools over 500:
3 sq. ft. a student
for Elem. & Jr. H.
3½ sq. ft. for Sr. H.
(2)
Ancillary
Teaching
Stations
(Regulations 35)
As per schedules
Co-ordination & overlap encouraged
(1)
CORE
Classrooms (CRs)
(Regulations 33 & 34)
Na/30 = Homerooms
Reduce by number of science experience classrooms
N/60 = Sc. Exp. CRs. in Elem.
N/30 × 1/7 = Sc. Exp. CRs. in Jr. H.
N/30 × 1/6 = Sc. Exp. CRs. in Sr. H.
Vocational Business Education
(Regulations Part V)
Nb/30 = Schedule of special Bus. Ed. labs + CRs. to total
Consult with pertinent H. S. Inspector re design.
Voc. Ind. (Regs. Pt. V)
Shops = Ni/20 × 1/2
CRs. = Ni/30 × 1/2
Add 1 - 2 Special "girls'" shops as needed
(4)
Home Ec. & Ind. Arts
(Regulations 36)
Nh/20 × 1/10 = Stations Jr. H.
Nh/20 × 1/8 = Stations Sr. H.
(7)
Staff
Centre
(Regs. 41)
As per schedule
In open area schools, reduce CRs. by 25 sq. ft. and add to staff work room.
(6)
Administration Centre
(Regulations 40)
As per schedule
(Includes Guidance)
Offices for principal, vice-principal for all schools & dept. heads or vice-principal at 1 per 500 students over first 500.
(8)
Infirmary
(Regulations 42)
As per schedule
(9)
Cafeteria-study (Regs. 43) in schools over 700.
(5)
Phys. Ed.
Classes × 40 min. periods / 35 = Stations
(Regs. 38) As per schedule
Adjustments to School Plant
Attainable Curriculum
Intended Teaching Methods
Community Use
(Community Disadvantage Upgrading)
Support Limits--
See Regs. 18 & 19

An existing school plus addition is analyzed as a Total School

Renovations (Regs. 10) may replace new construction.

The above is "traditional"--schools are encouraged to adjust within each area above: e.g. open-area schools, large-small instrction group schools, etc. Each is sized to fulfil curriculum and function involved.

NOTES:

N -- no. of students in the school 3 years after expected opening
Na-- no. of matriculation & general program students in Sr. H. or N if school is Jr. H. or Elem.
Nb-- no. of Vocational Business Education students
Nh-- no. of students to take Home Economics or Industrial Arts
Ni-- no. of Vocational Industrial/Technical students

Resulting Applications for Different Schools:

1. Elementary School - Category C - 480 pupils

15 classrooms + 1 science room
2 ancillary rooms of 1000 sq. ft. each
1 library of 1500 sq. ft.
1 gym of 3840 sq. ft. + 1220 sq. ft. for stage, storage, office
Administrative area of 1150 sq. ft.
Staff facilities 950 sq. ft. and,
Infirmary of 275 sq. ft.

2. Junior High School - Category B - 480 pupils

13 classrooms + 3 science experience rooms
2 ancillary rooms of 1000 sq. ft. each
1 library of 1500 sq. ft.
Industrial Arts - 3200 sq. ft., Home Economics - 1400 sq. ft.
1 gym of 4800 sq. ft. + 2240 sq. ft. for stage, storage, offices, and showers and dressing rooms
Administrative area of 1150 sq. ft.
Staff facilities of 950 sq. ft. and,
Infirmary of 275 sq. ft.

3. Senior High School - Category A - 1200 pupils

(a) If Academic - General:

23 classrooms + 7 science laboratories
6 business education rooms up to 6300 sq. ft.
Ancillary space up to 6000 sq. ft.
Library of 4200 sq. ft.
3-station gym of 10800 sq. ft. + 3260 sq. ft. for stage, storage, offices, showers and dressing rooms
Double Home Economics room of 2400 sq. ft.
Double Industrial Arts room of 4400 sq. ft. (depending on proposed program)
8 vocational shops approved and sized according to program or interrelationship with Industrial Arts or Industrial Education
Administrative area of 2450 sq. ft.
Staff facilities of 1850 sq. ft. and,
2 Infirmaries of 550 sq. ft.
1 Cafeteria study room of 4000 sq. ft. and servery of 800 sq. ft.

(b) If Academic - General and Vocational Business Education:

27 Home classrooms along with the 7 laboratories

In each of the above categories additional non-instructional space would be recognized for corridors, mechanical rooms, storage, and other requirements.

SASKATCHEWAN

Developing principles of recognition of facilities in Saskatchewan pertain to need for replacement of very old buildings or expansion of others because of increased population or larger enrolments resulting from centralization or other special conditions. Portables may be acknowledged in developing areas until increased enrolment warrants several rooms of permanent construction. The regulations, guidelines, and suggested dimensions and areas for support were expected to be of assistance in planning facilities. However, the average size of some approved have been larger than the sizes suggested in a policy statement. When the Department considers plans for new buildings the proposed sizes are considered in relation to the programs as well as the ratio of instructional area to non-instructional space. The design is also noted as, for example, the open area concept in elementary schools. Building has declined considerably.[1] The bases of approval for facilities correspond largely to those in other areas.

Usually science laboratories are considered as home-rooms. Physical education facilities depend on the enrolment and on uses as an auditorium for use by the school and community. Sometimes the community may make a contribution to get a larger one than would be ordinarily approved or when considerable use is wanted according to local agreements. Kindergartens are not currently supported by capital or operational grants. However, a Department study now favors recognition of such classes and recommends supplying portables (24' x 36') with utilities which may sit independently or be joined to the main building. Existing space in buildings may be acknowledged and more of this space may become available as enrolments decline.

Boards may present construction proposals and cost estimates for approval. The requests may reflect what has been built in other centers. The sizes of some desired facilities may be larger than the sizes suggested for approval and would need justification for approval. Current recommendations subject to some expected revisions appear in the following chart.

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[1] For 1970-71 construction included 129 classrooms including 8 science laboratories; 15 libraries; 1 commercial room, 4 home economics rooms, and 5 industrial arts facilities; 21 gymnasium-auditoriums (over 200 sq. ft.) and 3 gym service areas; space for 1 social studies area and a guidance room; 4 music rooms; 2 art rooms and 1 cafeteria.

Suggested allowable spaces:

	No. Of Facilities	Sq. Ft. Min. Max.	
1. Classrooms-		700- 768	
2. Science Laboratories			Usually homerooms
-small schools-	1	700- 770	26' or 30' width sug.
-J.H.S. (6-9 classes)	1	1050+	200 for storage
-over 300 students	2		add 1 more facility for each 300 additional students
-Senior high schools			
-(6-9 classes)	2	1000+	200 for storage
-over 300 pupils	3	1000-	one each for chemistry, physics & biology
3. Ancillary (music, art, science)			perimeter counters & moveable tables
-Elementary (120-200 pupils)	1	800- 900	+ additional space for increased enrolment
4. Industrial Arts & Home Economics			
-approvals based on recommendations of Department consultants in respect of size and and hopefully, 60% time use.			
-Guidelines			
(a) Industrial Arts			
-Junior High School			
240 pupils	1	1600-2400	
Junior & Senior H.S.			depends on consultation about enrolment and program.
(b) Home Economics			
Up to 10 classes	1	1200-	single facility probably for foods & for textiles depending on consultation
Over 10 classes	2		
5. Auditoriums			
separate ones if enrolments exceed 1200 or if existing gymnasium is inadequate.			-presumed auditoriums may serve some auxiliary functions (team-backing or drama. Gyms will usually serve as auditoriums - acoustics should receive attention. A portable stage may be approved.
6. Library Resource Center		Varies	-to accomodate 15-20% of enrolment
7. Physical-Education			
-multipurpose room enrolments less than 150	1	1500-1800	+200 for storage chairs and portable stage - serves as assembly room
-where gym also serves as auditorium a stage may be approved as a special condition	1		portable stage + storage
-gymnasiums		2600-8400	sized in a schedule according to enrolment -same
8. Gymnasiums			
Chart on succeeding page.			

Gymnasium Area Guidelines

	Enrolment	Academic Classrooms	Gym Teaching Station	Gym Floor Area	Ceiling Height	Approx. Dimens.	Service Facilities Gym Storage	Locker Rooms	Shower Rooms	Drying Rooms	Toilets Wash Rm.	Inst. Office	Total Serv. Facil.	Total Gym & Service	Actual Rati Gym to Service
Div. I & II (grades 1 to 6) and elementary schools (grades 1 to 8)	Below 180 180 to 240	6 to 8	1	1800 2600	12 16	30 x 60 42 x 62	120 150	300	-	-	130	120	700	3300	78.3/21.2
	270 to 360	9 to 12	1	3500	20	50 x 70	150	400	-	-	130	120	800	4300	81/19
	390 to 600	13 to 20	2	4800	22	60 x 80	200	500	-	-	150	150	1050	5750	-
Div. III Schools (grades 7, 8 and 9)	300 to 400	10 to 14	1	4800	20	60 x 80	500	600	300	200	150	150	1900	6700	73/27
	450 to 600	15 to 20	1	5600	22	62 x 92	500	600	300	200	150	300	2050	7650	73/27
Div. IV and Secondary Schools (grades 9-12)	300 to 420	10 to 14	1	5400	22	60 x 90	500	600	300	200	150	150	1900	7300	74/26
	450 to 570	15 to 19	1	5600	24	62 x 92	500	600	300	200	150	300	2050	7650	73/27
	600 to 720	20 to 24	2	6300	24	70 x 90	700	800	400	200	150	300	2550	9050	72/28
	750 to 1200	25 to 40	2	8400	24	84 x 100	800	1000	500	250	150	400	3100	11,500	73/27
Combined Div. I, II, III & IV	Below 150 150 to 250	4 to 7 7 to 10	1 1	1800 4000	14 20	30 x 60 50 x 80	200 400	300 400	200	100	150	120	1370	5370	75/25
	260 to 540	11 to 18	2	5400	22	60 x 90	500	600	300	200	150	300	2050	7450	72/28

MANITOBA

Regulations on Manitoba indicate the minimum space of instructional facilities, schedule the size of the gymnasium, and specify the maximum gross area including exterior walls. The gross amount in a project must be approved although some of it may not be supported. As in other provinces instructional space is defined. It is intended to be at least 60 per cent of the gross area in new projects and about 65 per cent in additions. The total approved instructional area may be allocated according to local desire but must accommodate the number of students for which the recognition was given.

Requirements are specified for many facilities. Here, again, the science laboratory is classed as a home-room. A multi- purpose room is intended as use for audio-visual aids, art and music as well as for a lunch room. It is not intended for kindergarten nor to serve the purpose of a lunch room only. No language laboratory is provided. Gymnasiums are for physical education only and so no stage is provided. A stage could be incorporated in a multi-purpose room adjacent to the gym. Increases of gymnasium areas have been in accordance with expanded concepts in the revised physical education program. Recognition is given for industrial arts facilities and equipment if enrolment and programs justify it. Unusual program conditions may warrant special consideration. For a limited number of students, only one home economics general purpose room may be allowed. Some rooms may be combined in open area or a lecture room but no additional space is granted. A limitation indicates that no more than two-thirds of the instructional area shall be approved as open space. Plans must indicate locations of corridors if space were to be converted to classrooms. Tiering of lecture rooms is not approved because of the inflexibility. Approved plans should ensure provision for expansion, flexibility, and adaptability. The Building Committee is concerned about the relationship of various areas to each other and the simplicity of design. Classroom walls in new schools are non-bearing. Space for kindergarten is recognized. Area requirements for special classes are currently under study.

Space for vocational programs has been approved for some high schools that have a minimum enrolment of 800 pupils.[1] Most of the funds according to

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[1] Approvals are limited to large centres and much of that building has been done in the cities and areas comprising the seven regional high schools areas.

the Federal-Provincial Agreement have now been used. The Vocational-Technical Branch of the Department consults with school boards about the extent of programs and needed facilities. Plans showing spaces are examined by a subject review committee before Department approval is given. One noteworthy feature of programs are the occupational courses for boys and for girls for which facilities are specified. Building features in various schools include carpets, mercury lights, recessed tables for some gymnasiums, sliding doors for storage, and air conditioning by roof units for open areas and gymnasiums.[1] Occasionally bleachers and mezzanine floor are featured. A few courtyards are covered or paved with some plastic material although favor has declined for this.

The size of a school and its program determine the amount of space per student. Obviously, the instructional area per student in a K-VI school is less than in a K-VII school where additional courses are provided. Space facilities for some facilities are indicated in the following charts.

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[1] In the Winnipeg School District a very extensive Report has been prepared on recommended guidelines for secondary schools; it was presented by an Advisory Building Committee in August, 1971.

Instructional Facilities

Pupil-groups
elem. - 23
H.S. - 25
incl. IX

CLASSROOMS
28 pupil - elem.
25 pupil - H.S.
Sq. Ft. 750

KINDERGARTEN
for two 25
pupil groups
a day
Sq. Ft. - 1000

SCIENCE
(home room)
Sq. Ft. -
1000

MULTI-PURPOSE ROOM
3.5 sq. ft. per pupil
(excl. of kindergarten)

May be larger by lunchroom recog. for $\frac{1}{2}$ enrol. X 10 sq. ft.

A lunchroom is not recognized as a separate facility.

MATERIAL RESOURCE CENTER

3.5 sq. ft. per pupil (excl. of kindergarten

HOME ECONOMICS
(18-20 Pupils)

General purpose - 1600

If more than one laboratory in a school each is 1400 sq. ft.

INDUSTRIAL ARTS

Jr. or S.H.S.
Min enrol - 200 pupils
(pupils may be conveyed)

	Sq. ft.
Woods & Plastics -	2800
Metal & Power -	2800
Electricity & Electronics -	2100
Drafting & Graphic Arts	2100

are recognized according to need of program, such as for occupational courses.

Future facilities for senior high school will be part of a vocational-composite secondary school.

GYMNASIUM

No. of Pupils	Sq. Ft.	Stations	Showers
ELEMENTARY 18' ceilings - no showers			
20-270	2400	1	
300-480	3500	1 Dividers	None
510-750	5400	2 may be	
760-990	5850	2 net	
1020-1290	6300	3 material or vinyl	
JUNIOR HIGH 22 ' ceiling			
300-450	4000	1	Varied
510-750	5600	2	-columns
780-990	7000	2	-banks or
1020-1290	8400	3	-individual
SENIOR HIGH			
300-500	5040	1	
510-750	6300	2	
780-1000	8000	2	
1030-1250	9500	3	
1275-1500	10800	3	

OCCUPATIONAL COURSES
may be offered to pupils over 15 years of age in some schools. If vocational facilities do not exist or suffice the following facilities may be provided.

	Class size	Sq. Ft.	Class-room
Girls:			
Family and Community Services	40	2100	$1\frac{1}{2}$
Hair Dressing	40	1400	$1\frac{1}{2}$
Boys:			
Auto Body	30	2100	$1\frac{1}{2}$

Welding is sometimes approved, particularly, if there are vocational facilities in the school.

Some work proceeding on an Agriculture program.

VOCATIONAL FACILITIES - (Minimum enrolment - 800)
For students spending 50% of time on vocational classes. Classroom area is designated for pupils in these programs. Some of the facilities may be used by students in occupational courses. They are not intended for general electives.

BUSINESS EDUCATION

35 - Pupil groups

	Enrol (2 groups)	Sq. Ft.	Class-room
Manual Typing	70	1000	1½
Business Machines	50	1000	1½

Larger enrolment may qualify for more of the following:

	Enrol (2 groups)	Sq. Ft.	Class-room
Electric Typing	70	1050	1½
Office Practice or with Sec. Space	50	1400 1500	1½
Bookkeeping and accounting	70	1050	1½
Merchandising	40	1500	1½
Data Processing	25	1050	1½
Secretarial lab.	60	1400	1½

TECHNICAL

Space for 440 students might have following allocations:

	Enrol	Sq. Ft.	Class-room
Showers Mechanics (incl. hydrulics)	80	6000	+ 1 ½
Electricity Electronics	60	3500	+ 1 ½
Metalwork (inc. laboratories for metllurgy)	80	5000	+ 1 ½
Building Construction (carpentry, plumbing, painting, trowelling)	60	4000	+ 1 ½
Industrial Design (Drafting, photography, commercial art)	70	3000	+ 1 ½
Graphic Arts	50	3000	+ 1 ½
Air conditioning	40	2500	1 ½

Dry cleaning approved at one school.
Welding in a few schools.
Clustering is favored in some open areas such as the building construction.

RELATED INSTRUCTION FACILITIES

	No. of Facilities	Sq. Ft.
Related Science Lab	3@ 1054	3168
Methematics Prep. rooms	3 @ 98	283
Communications	2 @ 800	1600
Library and information		4200
Combined Gym and Aud. stage		10800
Multi-purpose room (music, team teaching		21000
Related drafting		1000

Administrative area for the above is comparable to that of regular high schools without vocational programs.

ONTARIO

Approval of facilities in Ontario is related to an "Accommodation Unit Factor" (A.U.F.) which establishes the number of units awarded to each eligible space in a project according to the Manuel, "Instructions for the Calculation of Approved Costs". The sizes of the eligible instructional spaces are indicated by net functional floor area and are incorporated in the appropriate Accommodation Unit.[1] This reflects some ratio of the instructional space to the gross area approved.[2] Generally there has been from 52 to 58 percent of the gross area in the instructional section but this figure should be higher in relation to the gross area subject to support. In seeking acceptable utilization of space, pupil-loading is specified for most of the facilities; any unspecified items are subject to the discretion of the Department.

The new Regulations of 1971 increased many instructional areas, particularly at the maximums, and also revised the unit factors. Though the Accommodations Units were decreased for some facilities[3] substantial increases in many others raised the amount of approved costs. The increases were particularly noticeable for library resource centers and industrial arts shops at the elementary level. In addition the A.U.F. amounts were raised for higher grade levels; for example, an art room in an elementary school was allocated 190 Units for 1100 sq. ft. but 212 Units for the same sized facility in a senior elementary school.

Commendable features include seminar rooms, clusters of attractive offices, work rooms, lunch rooms and well-equipped gymnasiums. Large open spaces give a sense of roominess and adequacy for science suites or library areas as centers of large instructional areas. Floors are finished with attractive carpets, vinyl tile, or terrazzo. Many buildings, including those under the S.E.F. program, have air conditioning and moveable partitions,

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[1] The relationship of functional areas and A.U.F. was discussed at some length in the section on Support.

[2] For example a 600 pupil school of 43,280 sq. ft. might have 54% net functional instructional area of 23,425 sq. ft.; but this would be multiplied by the constant of 1.8 to establish nearly 3400 A.U.F.'s which $196 per A.U.F. for example might have grant approval for $670,000 for support debentures. As said earlier there might also be another 10% of that figure permitted for unsupported debentures for site, unsupported area, or excess costs.

[3] Decreases were established for some vocational areas.

and acoustical features in many sections.

The area per pupil differs considerably. Some boards, such as those of Metro Toronto may so exceed the provincial schedule for space approvals as to create need of a large local cost. The amount of space per student according to approved eligibility varies according to the grade levels and the size of the school. The average amount for elementary schools is about 72 sq. ft. and from 102 to 117 sq. ft. for senior schools. Core facilities are built in the first phase of construction so that additions to accommodate more students may lower the overall amount of space per pupil. The Regulations specify the size of facilities for:

A. Elementary schools - Grade K-VII

B. Senior Elementary Schools - Grades VII-X

C. Secondary Schools including technical vocational areas.

The following charts indicate the sizes and related information in respect of the approved eligible spaces and Accommodation Units for each classification.

A. ELEMENTARY SCHOOLS - GRADES K - VIII

Areas designed with Accommodation Unit Fractors (A.U.F.) increased according to enrolment.

N.F.F.A. is the net functional floor area expressed as sq. ft.

Classloading is set at 35 pupils.

CLASSROOM		KINDERGARTEN (cloakroom and washroom not included)		ART ROOM		MUSIC Instrumental (Double-class groups)		MUSIC Vocal		SCIENCE (with one or more laboratory sinks)		SPECIAL EDUCATION (Inclusive of washroom, or consultation spare)	
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A.	A.U.F.	N.F.F.A	A.U.F.	N.F.F.A	A.U.F.	N.F.F.A.	A.U.F.	N.F.F.A	A.U.F.	N.F.F.A.	A.U.F.
750	140	Min. Max. 700 +49 Up to 1200	154 To 172	Min. Max 800 +24 Up to 1100	146 To 190	Min. Max. 1000 +24 Up to 1400	214 To 274	Min. Max 850 +24 Up to 1225	159 To 215	Min. Max 700 +24 Up To 850	143 To 154	Min. Max. 700 +49 Up to 900	172 To 179

If VII - X included eligible space may correspond to secondary sizes except for language, chemistry, biology, geography, laboratories or for typewriting or lecture rooms.

INDUSTRIAL ARTS Single		INDUSTRIAL ARTS Double		HOME ECONOMICS		LUNCH ROOM (if need substantiated by inspector)		HEALTH ROOM		GUIDANCE AND COUNSELLING -Information space. No Administration Area		GENERAL PURPOSE Activity (Gymnasium)	
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A.	A.U.F.
1300 +24 Up to 1500	245 To 280	2200 +24 Up to 2500	420 To 464	1100 +24 Up to 1300	205 To 240	375 +24 Up to 1100	58 To 142	150 +10 Up to 475	33 To 69	100 +24 Up to 400	27 To 60	1500 to 3150 up to 6350 sq. ft. Details on next chart	

The N.F.F.A . does not include mazzanine or bulk storage.

Library and Resource Center
basically 5 sq. ft. per student for 210 students - 1000 sq. ft. increased enrolments may quality up to 3000 sq. ft. with an A.U.F. of 430. Details on a following chart.

GENERAL PURPOSE ROOM (GYMNASIUM)
ELEMENTARY SCHOOL

I. Single Station

A - Less than 210 pupils

N.F.F.A. Min. Max.	A.U.F.
1500	203
+24	To
Up to 2000	260

The facility for less than 210 pupils should be readily capable of ultimate division into 2 areas.

B - 210 or more pupils (exclusive of kindergarten)

N.F.F.A. Min Max.	A.U.F.
2000	288
+24	3
Up to 3150	423

II. Double Station

-650 or more pupils (exclusive of kindergarten)

N.F.F.A. Min. Max.	A.U.G.
4000	576
+24	3
Up to 6300	849

Shall be readily divisible into two spaces by means of a folding partition or moveable wall.

Unobstructed ceiling height shall be 18 feet.

The functional areas do not include stages.

The approved cost may be determined in accordance with the net functional floor area applicable to an approved five-year projection of pupil enrolment.

Changing Rooms (including drying rooms) shall be required for boys and for girls.

N.F.F.A. Min. Max.	A.U.F.
250	32
+25	To
Up to 450	46

Showers included in changing rooms for enrolments of at least 350 pupils in Grades VII - X.

N.F.F.A. Min. Max.	A.U.F.
500	94
+25	To
Up to 850	146

LIBRARY RESOURCE CENTRE (For Elementary Schools)

A library resource centre in a school of not less than 210 places:

Minimum Net Functional Floor Area 1,000 sq. ft.

The Accommodation Unit Factor varies according to the Net Functional Floor indicated in the following table:

N.F.F.A.	A.U.F.	N.F.F.A.	A.U.F.	N.F.F.A.	A.U.F.
1000-1024	184	1675-1699	274	2350-2374	355
1025-1049	188	1700-1724	277	2375-2399	358
1050-1074	192	1725-1749	280	2400-2424	361
1075-1099	196	1750-1774	283	2425-2449	364
1100-1124	200	1775-1799	286	2450-2474	367
1125-1149	204	1800-1824	289	2475-2499	370
1150-1174	208	1825-1849	292	2500-2524	373
1175-1199	212	1850-1874	295	2525-2549	376
1200-1224	216	1875-1899	298	2550-2574	379
1225-1249	220	1900-1924	301	2575-2599	382
1250-1274	223	1925-1949	304	2600-2624	385
1275-1299	226	1950-1974	307	2625-2649	388
1300-1324	229	1975-1999	310	2650-2674	391
1325-1349	232	2000-2024	313	2675-2699	394
1350-1374	235	2025-2049	316	2700-2724	397
1375-1399	238	2050-2074	319	2725-2749	400
1400-1424	241	2075-2099	322	2750-2774	403
1425-1449	244	2100-2124	325	2775-2799	406
1450-1474	247	2125-2149	328	2800-2824	409
1475-1499	250	2150-2174	331	2825-2849	412
1500-1524	253	2175-2199	334	2850-2874	415
1525-1549	256	2200-2224	337	2875-2899	418
1550-1574	259	2225-2249	340	2900-2924	421
1575-1599	262	2250-2274	343	2925-2949	424
1600-1624	265	2275-2299	346	2950-2974	427
1624-1649	268	2300-2324	352	2975-2999	430
1650-1674	271	2325-2349	352	each further 25 or part thereof add 3 AUF's	

For the purpose of arriving at the Approved Cost, the maximum net functional floor area for a library resource centre shall be determined on the basis of 5 sq. ft. per pupil place.

The total of pupil places which determines the size of the library includes kindergarten pupil places.

The Approved Cost of a library resource centre will, if a board so requests, be determined in accordance with the net functional floor area applicable to an approved five year projection of the total of pupil places in a school, notwithstanding that the remainder of the accommodation is provided for a lesser period of projection.

The Net Functional Floor Area of the foregoing shall be measured over any book stacks or fittings used to divide the whole space into various functional spaces.

The Net Functional Floor Area includes spaces for charging, reference or reading rooms, audio visual equipment, seminar rooms, study carrels, office and workroom, but shall not include library materials storage.

B. Eligible Space for Senior Elementary Students - Grades VII - X

For the purpose of determining the Approved Cost of Accommodation for pupils in grades 7 - 10 inclusive, such accommodation shall be dealt with as follows:

1. An elementary school wherein any of grades 1 to 10 are accommodated, having 349 or fewer pupil places, shall have the whole of the proposed Eligible Spaces (whether in a new school or an addition to an existing school) dealt with as elementary schools.

2. An elementary school wherein any grades 1 to 10 are accommodated having 350 or more pupils places shall have the whole of the proposed Eligible Spaces (whether in a new school or an addition to an existing school) dealt with as elementary school, excepting that

   (a) classrooms for Grades 7 - 10 pupils, and

   (b) any art room, music room, science laboratory, home economics room, industrial arts room, only where at least grades 7 and 8 are in the school and

   (c) commercial room - only where grades 9 and/or 10 are in the school shall be dealt with as senior elementary school.

3. An elementary school having 525 or more pupil places in any combination of grades 7 - 10 shall have the whole of the proposed Eligible Spaces (whether in a new school or an addition to an existing school) dealt with as senior elementary school. Grades K - 6 within such a school shall be dealt with as elementary school. Normally it is expected that in such a school: -

   (a) the pupil enrolment will be on a partial rotary system, and

   (b) there will be provided a library and a gymnasium with changing and shower facilities, and a minimum of three eligible spaces from the following list:

      -science laboratory
      -home economics (general) room
      -industrial arts room
      -art room
      -music room

B - Senior Elementary Schools - Grades VII - X

Classrooms of not less than 750 sq. ft. and acceptable classroom equivalents, such as in geography or history, shall be awarded an Accommodation Unit Factor of 157. The Net Functional Floor Area shall not include wardrobes or coat space.

Should any arrangement other than conventional teaching spaces be adopted, then the normal pupil accommodation shall be caculated to determine class equivalents.

The Art, Music, Science, Home Economics, and Industrial Art allocations apply to Grade VII or higher.

CLASSROOM

N.F.F.A. (sq. ft.)	A.U.F.
Min. -	
750	157

ART ROOM

35 pupil-group For VII or above

N.F.F.A. Min. Max.	A.U.F.
900	184
+24	To
Up to 1100	212

MUSIC

pupil-group of 60 is recommended

Instrumental

N.F.F.A. Min. Max.	A.U.F.
1100	265
+24	To
Up to 1500	340

Vocal

N.F.F.A. Min. Max.	A.U.F.
900	184
+24	To
Up to 1100	212

SCIENCE LAB DEMONSTRATION DESK AND FIVE PUPILS' SINKS

N.F.F.A. Min. Max.	A.U.F.
900	241
+24	To
Up to 1200	253

COMMERCIAL ROOM

(only for IX and X)

N.F.F.A. Min. Max.	A.U.F.
900	230
+ 24	to
Up to 1400	286

SPECIAL EDUCATION ROOM

N.F.F.A. Min. Max.	A.U.F.
700	170
+49	to
Up to 900	175

INDUSTRIAL ARTS

Single

N.F.F.A. Min. Max.	A.U.F.
1300	290
+24	to
Up to 1700	365

Double

N.F.F.A. Min. Max.	A.U.F.
2200	488
+24	to
Up to 2800	580

HOME ECONOMICS

N.F.F.A. Min. Max	A.U.F.
1200	270
+24	to
Up to 1300	285

LIBRARY RESOURCE CENTER

5 sq. ft. Per Pupil

N.F.F.A. Min. Max.	A.U.F.
1000	208
+24	to
Up to 5599	766
any further 25 add ⟶	3

GYMNASIUM

Single

N.F.F.A. Min. Max.	A.U.F.
2800	425
+24	to
Up to 3150	465

Double

N.F.F.A. Min. Max.	A.U.F.
4500	720
+24	to
Up to 6300	933

N.F.F.A. Min. Max.	A.U.F.
500	94
+24	to
Up to 850	146

HEALTH UNIT

N.F.F.A. Min. Max.	A.U.F.
200	39
+24	to
Up to 600	84

COUNSELLING AND GUIDANCE CENTER

N.F.F.A. Min. Max.	A.U.F.
250	45
+24	to
Up to 700	96

LUNCH ROOM

(If need substantiated by Regional Director)
Min. enrolment - 210

Sq. Ft.	A.U.F.
Min. Max.	97
700	to
+24	274
Up to 2199	
Any further 25 add ⟶	3

Max. N.F.F.A. equals

$$\frac{\text{enrolment}}{3} \times 10$$

C. Secondary Schools
IX - XIII Eligible Spaces

N.F.F.A. - in sq. ft.

Pupil loading at 30 per classroom or equivalent teaching space.

Several areas increased in 1971, particularly, at the maximums. Larger A.U.F.'s were allocated so that approved cost increased.

Larger spaces were designated for support in laboratories and more A.U.F. allocated for some such as chemistry; e.g., there would be more support for a chemistry lab. at 504 A.U.F. than for a physics lab. of the same area at 470 A.U.F. although these differences lessen as the area increases.

CLASSROOMS class loading 30 pupil-group		LECTURE ROOM		& SEMINAR ROOM		SCIENCE 30 pupil-groups					
		pupil load proportionate to size				Physics & General		Biology		Chemistry	
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.
750		1400	408	200	109	950	470	1000	490	950	504
	240	+24	To	+24	To	+24	To	+24	10	+24	12
		Up To 1600	464	Up To 400	130	Up To 1400	640	Up To 1400	- 640	Up To 1400	- 640

ART 30 pupil-group		MUSIC 80 Pupil-group Instrumental (Incl. Storage and Practice Rooms) 60-pupil group		Vocal		Typewriting (Elective) 30 pupils		LIBRARY RESOURCE CENTRE (Incl. of Reading, Seminar and Work Rooms, Carrels Office and A/V Materials)	
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.
900	328	1100	456	900	336	900	360	1500	588
+24	To	+24	To	+25	To	+25	To	+24	To
Up To 1100	384	Up To 1500	546	Up To 1100	378	Up To 1200	470	Up To 6000	1724
								Further 25 add	6

Approved cost related to 5 sq. ft. per pupil

. Secondary Schools
rades IX - XIII

HOME ECONOMICS 20 pupil-groups						INDUSTRIAL ARTS 20 pupil-groups			
Foods and Nutrition		Clothing and Textiles		General		Single		Double	
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.
1100	476	1000	420	1200	548	1500	546	2700	960
+24	To	+24	To	+24	To	+24	To	+24	To
Up To 1350	548	Up To 1250	548	Up To 1350	588	Up To 2500	820	Up To 3400	1150

GYMNASIUM		CHANGE ROOM (Including Showers, Drying and Dressing Space)		LUNCH ROOM (If Approved)		CAFETERIA (If Approved) 1/3 enrolment x 10 square feet		KITCHEN & SERVERY	HEALTH UNIT		COUNSELLING AND GUIDANCE	
SINGLE GYM:												
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	17 1/2% of area of cafeteria	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.
3150	935	650	216	1500	150	2000	606		250	70	300	88
+24	To	+24	To	+24	6	+24	TO		+24	To	+25	To
Up To 3525	1032	Up To 1000	320	Up To 1999	444	Up To 2299	660		Up To 700	172	Up To 1200	260
or												
Up To 4500	1266										Counselling and information Space; No Administrative Area	
DOUBLE GYM:		TEAM CHANGE ROOM										
N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.									
6150	1828	550	186									
	To	+24	To									
Up To 8000	2300	Up To 1000	320									

SECONDARY VOCATIONAL Eligible Spaces	BUSINESS MACHINES AND OFFICE PRACTICE		TYPEWRITING ROOM		BOOKKEEPING AND ACCOUNTING		SECRETARIAL		COMMERCIAL PRACTICE LAB.		COMPUTER STUDIES UNIT		MARKETING AND MERCHANDISING	
I. Commercial														
30 pupils for class loading	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.	N.F.F.A. Min. Max.	A.U.F.
	900	326	900	326	900	326	900	326	500	170	750	270	1200	408
	+24	6	+24	6	+24	6	+24	6	+24	5	+24	8	+24	8
	Up To 1300	- 416	Up To 1200	- 392	Up To 1200	- 392	Up To 1325	- 422	Up To 575	- 200	Up To 1100	- 374	Up To 1300	- 495

Areas may increase according to enrolment but the limit of approved cost for legislative support is indicated by the maximum A.U.F. allocated.

For example, a Computer Studies Unit may be permitted at the minimum of 750 sq. ft. of net functional floor area at 270 Accommodation Units or a larger room for more pupils might be approved and the support would be raised accordingly by successive allocations up to 374 units. But any size over 1100 sq. ft. would only get legislative grant approval at the maximim limit of 374 units at the specified value of support per A.U.F.

SECONDARY VOCATIONAL
Eligible Spaces

II. Technical

20 pupils for class loading

- determined by the Department if not specified.

	N.F.F.A. Min.		N.F.F.A. Max.	A.U.F.
AUTO SHOP Mezzanine space not included	2750	+24	Up To 3250	826 To 940
BUILDING CONSTRUCTION CARPENTRY AND MILLWORK (Combined in 1971)	2250	+24	Up To 3000	658 To 832
DRAFTING AND PRINT ROOM	950	+24	Up To 1200	308 To 380
ELECTRICITY-ELECTRONICS SHOP	1800	+24	Up To 2300	671 To 785
ELECTRONICS	1800	+24	Up To 2000	671 To 713
MACHINE SHOP	1800	+24	Up To 2300	556 To 670
WELDING	1800	+24	Up To 2500	551 To 713
REFRIGERATION, AIR CONDITIONING, SHEET METAL, HEATING AND PLUMBING	1800	+24	Up To 2500	551 To 713
INDUSTRIAL PHYSICS	1200	+24	Up To 1600	535 To 685
INDUSTRIAL CHEMISTRY	1000	+24	Up To 1200	517 To 601
OCCUPATIONAL SHOP -GIRLS-	1800	+24	Up To 2500	651 To 813
OCCUPATIONAL SHOP -BOYS-	1800	+24	Up To 2500	616 To 778
GREENHOUSE (HORTICULTURAL) ADJUNCT OF OCCUPATIONAL SHOP WHICH INCLUDES THE WORKROOM	1000	+49	Up To 1175	100 To 115
AGRICULTURE SCIENCE LAB.	750	+24	Up To 950	355 To 425
GREENHOUSE (AGRICULTURAL) ADJUNCT OF SCIENCE LAB.	1600	+49	Up To 2100	170 To 275

All Vocational Facilities receive legislative support up to specified amounts for furniture and equipment.

QUEBEC

The nature of facilities in Quebec are specified in a Technical Program of Construction[1] and boards' request are subject to approval of the Directorate of Buildings and Equipment. The need of building must first be recognized.[2] The Directorate may issue directives when sketches or working drawings are submitted or before final plans are approved. Excess area is not recognized. Plans must clearly show intended areas for instruction, services, administration, and personnel work. Directives may be issued in respect of the different areas, thermal and phonic insulation, air condition, or interior finishes. They may include attention to design, structùre, site conditions, mechanical services, nature of facilities, and maintenance considerations. They also specify the arrangement of electrical supply sub-stations, metering, and main distribution center requirements for such apparatus as fire alarms, clocks, television, and communications systems. If air conditioning is available, interior classrooms are permitted which contribute to compactness and economy. It is mandatory to include mechanical ventilation and to design for air-conditioning or its later addition.[3] Non-instructional space for administrative areas is generally specified. The space allocated for circulation, partitions, and walls varies from 20 to 30%; the space designated for mechanical installations is up to 5% of the gross area.

Pupil loading may be for at least 30 in the elementary and 20 in the high schools. If a project proposed among school districts involves a number of pupils in excess of 30 or 20 respectively at the elementary or senior levels, an agreement may be negotiated; it must have the Minister's authorization to prepare such agreement.[4]

The size of the school, dependent upon enrolment, influences economies. Tendencies to group existing high schools into larger ones of approximately 2,000 pupils warranted large programs with considerable choice of options.

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[1] Programme technique de Construction (Service de la Normalisation) prepared by the Directorate of School Buildings and Equipment.

[2] Special conditions may apply. For example, approval may be given for construction of a comprehensive secondary school only on condition that one has not already been authorized in the location of a local school board.

[3] Economics intended are such that, even with this requirement, costs apparently declined in the first 18 months after the controls were instituted.

[4] Indentification No. 08-06-04A, Dec. 1, 1970 - quoted in Manual.

Vocational education has been largely integrated into the comprehensive schools.

The inclusion of occupational training programs, trade subjects, and exploration of technology and agriculture courses have greatly increased the offerings in the regional high schools. Experience from many projects has indicated economic advantages of building large schools. Directives concerning more compactness and functional space utilization have contributed to a reduction of average space per student. This is about 110 sq. ft. in the regular high school.

During the past year there was over 150 millions of construction, chiefly in the high schools. Outstanding items included large foyers at the base of commodious central stairways, student group rooms and teachers' offices, and mezzanine floors as well as brick or masonry finishes with decorative features, display cases, or murals on many walls. The lunch rooms or cafeterias in many schools can be subdivided for teaching areas; several feature mounted blackboards and stub partitions. Physical education facilities show generous regard for large areas, much equipment, well furnished floors, expensive dividers, and some covered track and field areas.[1] Some areas are supplemented by smaller gymnasiums or activity rooms. These gyms are not always available for community use where auditorium-theatres or large lecture rooms have been provided. They serve as auxiliary space in schools where special ancillary rooms are designed chiefly for music and art; auditoriums are seldom approved now although there is recognition of some large general meeting place. Swimming pools are approved for support and serve community use as well. Open space is featured in new elementary schools but there is little in high schools except in some technical-vocational shops where one area simply extends into the next. Libraries are well lighted, carpeted, and frequently the ceilings have acoustic plaster. Both steel and pre-stressed concrete beams have been used.

Walls in most new construction are non-bearing and moving is facilitated in that they usually do not contain mechanical services. A

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[1] One building, the Baldwin-Cartier, was comprised of two large schools for about 1500 each of English and French students with a common library, cafeteria-study room and a very large gymnasium adjacent to a large covered track and field area that enclosed space sufficient for nine large basketball courts.

considerable number of buildings are heated by electricity or oil; many are air-conditioned. Room is not provided for kindergartens though these are recognized if space becomes available. Accommodation for special classes may be recognized if the need is confirmed by the Department. Similarly, approval is required for offering vocational courses before facilities are approved.

Although the directives are very comprehensive, it is held that they are not intended to restrict the architects' planning and design, and that in emphasizing quality and cost controls, they might eliminate non-essential features and indicate administrative and technical aspects of planning. Examples of space allocations are shown in the following charts.

APPROVED SIZES FOR FACILITIES

Kindergarten may be recognized for operating grant.

Pupils 5 years old by Oct. 1. Teacher has special training.

	CLASSROOM	LABORATORIES Physics - Chemistry - Biology - Natural Sc. - History - Geog.	LANGUAGE LABORATORY	ART ROOM	SPECIAL INSTRUCTION ROOMS 30 pupil-groups				AMPHITHEATRE (DRAMATICS)
						MUSIC ROOMS			
	30 pupil-group		35 pupil-group	Incl. Sink	Vocal	Instrumental	Practise Room	REL. INST.	60 pupil-groups
	sq. ft. Type 1 - 750	sq. ft. 1000 + 175 Storage & Prep.	sq. ft. 780 Up to 980 Incl. carrels	sq. ft. 1140	sq. ft. 1100	sq. ft. 1200	sq. ft. 50	sq. ft. 780	sq. ft. 780 - non-permanent steps or terrace

There is available space

AUDIO VISUAL ROOM	LIBRARY Main Room &	Service Areas
Up to 1500 sq. ft. according to enrol. May be some carrels at 15 sq. ft.	sq. ft. 25 x 10% of enrol.	sq. ft. 10 x 10% of enrol.
	approximates 3½ sq. ft. per pupil	

OTHER SPECIAL CLASSES

Space may be provided if need is confirmed by Department of Education. Approval might be for Physics 43 or for classes for handicapped pupils.

PRINCIPAL	VICE-PRIN.	SUPERVISOR	SECRETARY AND GEN. OFFICE	COUNSELLOR	GEN. OFFICE	PASTORAL SERVICES 1 per 600 pupils	STAFF CONFERENCE ROOM	STUDENTS' WORK ROOM	MEDICAL ROOM	INFIRMARY
180	150	100	250	100	100	125	sq. ft. 15 per member	3 per student to approved maximum	one side 22' min.	

In addition to these, space is approved for washrooms, a bookstore, a caretaker's washroom, and a staff common room depending on the size of the school.

Walls and circulation may approximate 20 - 30% of the instructional area; mechanical and electrical represent about 5% of the gross area.

PHYSICAL EDUCATION FACILITIES:	GYMNASIUM	SHOWERS AND DRESSING ROOMS	STORAGE	MEZZANINE BENCHED FOR	
Many large schools may have gymnasiums, auditorium, swimming pool, field areas, caféteria space.	24' ceilings Elem. - 18' ceilings Single - 60' x 95' - 5760 Double - 110' x 110' - 12100 3 Station - 110' x 165' - 18150 4 Station - 102' x 240' - 24600 or - 120' x 205' -	No. Area 1 - each sex - 2 - each sex - 3 - each sex - 4 - each sex -	10% of gym floor 15' - 20' deep	+ 120 spectators + 275 spectators + 450 spectators	Administrative Area as approved for Offices, Workrooms, Cloakrooms, and Dressing Rooms and Showers for Physical Educations staff personnel.
Some may serve auxiliary purposes and community uses.	Ancillary gym - 60' x 96' - if recognized.		15% of gym floor	+ spectators	
These may apply more particularly to large regional high schools.	Special Activity Rooms with 14' ceilings may be recognized for		5% of area of floor		
The area of the gym is dependent on the number of 30 pupil-groups using it.	Physical Conditioning - 40' x 70' Rhythmic Activities - 40' x 70' General Activities - 40' x 70' Wrestling, Etc. - 50' x 70'				

These represent about 9 alternatives; a 3000 student school might chose 6 of them; for example, a gym, pool, auxiliary gym, special activity room, etc. If a college is near by, the physical education facilities of the school and the college may be used by groups from both institutions.

In areas of limited population the gymnasium may serve as a community centre.

Classrooms		Gym Area
6 - 10	-	2400
12 - 24 - 2 St.	-	4800

18' ceilings

In some of the large regional high schools facilities for other basic services such as repairs, laundry, or extra storage may be provided from 400 to 850 sq. ft.

Where gymnasium will serve for community use special needs may be recognized for facilities and equipment. Larger entrance foyers, cloakrooms or lockers, and washrooms may be provided.

There is provision that school boards shall supply working area, equipment and furniture for the Social Service Agency working at the school within the framework of norms accepted by the Department of Education.

(Directive 18.02.02A- December 1, 1970)

AUDITORIUM

FOOD SERVICES

	AUDITORIUM If Recognized	STAGE	DRESSING ROOMS AND WASHROOMS	PROJECTOR ROOM	STUDENTS' ACTIVITY ROOM IF APPROVED	CAFETERIA If Recognized	DINING ROOM AND SNACK BAR	STAFF DINING AREA	KITCHEN	WASHROOMS
Auditoriums may be subdivided easily or partly so for lecture rooms. They may serve for community use.	Sq. Ft. 7.5 sq. ft. x 20% of enrolment	Sq. Ft. 800 Uo To 2000	Sq. Ft. 2 @ 200 sq. ft.	Sq. Ft. 150		Separated from auditorium by folding partition for community use. Both areas carpeted.	Sized according to enrolment for 3 sittings at 13 sq. ft. per pupil to be accommodated.	2 groupings at 12 sq. ft. per person.	Sized according to size of dining room.	

SWIMMING POOLS

If Recognized (Inclusive of services)	SAUNA ROOM	SHOWER ROOM	DRYING ROOM	DRESSING ROOM 45 pupil-group	MEZZANINE AREA
Type 1 - 25 m x-6 corridors		186	190	4 sizes 900	Spectator space for
Type 11 - 20 m x 6 corridors					+ 225
Type 111 - 25 m x 4 corridors					+ 120
Type 1V - 20 m x 4 corridors					+ 75
					+ 60

COVERED TRACKS & FIELD AREAS

30' Ceiling DIMENSIONS	Various Activity Areas DIMENSIONS	SPECTATOR SPACE
133m x 4 corridors	- General 140' x 205' - Javelin 24' x 48'	+ 450 persons

Storage area - 10% floor area and some for outside equipment
Washrooms - 2 at 150 sq. ft.

Vocational Education

Proposals for offering vocational courses must have the approval of the Department of Education. However, existing vocational programs have been largely integrated into the comprehensive secondary schools in which many more electives have been introduced.

The twenty or so technical options comprise about eight main fields of attraction in the total program that includes long-term occupational training, exploration of technology, trade courses, and other fields such as nurse assistant. Agriculture courses are also provided in about twelve regional high schools. Regulations in respect of facilities are under current review. Proposals are submitted for approval. The existing facilities for business education and technical electives appear comparable to those established in other provinces under the federal-provincial agreement.

NOVA SCOTIA

Nova Scotia has not established regulations about the size of facilities. However, the amount of support for different facilities influences the educational specifications and also the spaces that might be recognized. Pupil-loading is based on 30 pupils to determine the number of classrooms to be approved. Kindergarten space is not recognized as children five years old by October 1st are regularly admitted. There is favor for classrooms of 720 to 750 sq. ft. and high school science laboratories of 1200 to 1300 sq. ft. The proposed suggestions of 3 sq. ft. per student for libraries or resource centers is expected to include the office as well as a staff room. Application of the support figure up to $20 a sq. ft. for a library is limited by the product of $2000 and the number of classrooms so that a ten-room school, for example, might be allocated $20,000 for a library of 1000 sq. ft. for about 300 pupils. A lunchroom may be approved for supporting grants if there are over 500 pupils. A multi-purpose room might be recognized if many services can be provided there. For example, at a maximum support of $80,000, it could have 4,000 sq. ft. with a ceiling of from 14' to 18' and provide space for some physical education. Increasing emphasis on physical education is evident in the attention to playing fields. However, rising costs of land in some areas may limit sites and influence two-storey school construction.

New building features indicate improved ventilating systems although there is little air-conditioning. Open area instructional space is limited.

The nature of facilities is approved by the province. The extent of the program has an influence on that approval. Technical programs have not been generally incorporated in the regular high schools, but rather established in provincial ones. Certain technical courses may be offered at the technical institutes although it is expected that most vocational courses and occupational programs will continue to operate in regional vocational schools in a more structured arrangement for the majority of two-year students.

NEW BRUNSWICK

Facilities in New Brunswick are not conditioned by specific regulations. However, guidelines are indicated in a handbook[1] concerning the instructional program. These suggest that new schools should have at least 12 teaching stations and additions should be in multiples of six and that 700 sq. ft. should be the minimum size of a teaching station. General recommendations for elementary or high schools pertain to kitchen space next to the gymnasium, to libraries, and to administrative and service areas as well as many other items. Approval favors a suggested allowable space per pupil for different facilities. The extent of facilities depends on the program to be offered which in turn depends on the enrolment. For example, occupational courses might be offered in secondary schools having 600 -1000 students and enrolments over 1000 students might warrant a full program including the technical-vocational courses. Some facilities might be larger than usual to accommodate community use of them.

By not specifying mandatory requirements there is freedom to approve proposed building plans according to suggested guidelines or appropriate modifications of them. Suggested sizes of many facilities are itemized below for different grade levels:

ELEMENTARY

Facility	Min. Area Sq. Ft.	
Classroom -	700	
Science Lab-	1000	- I lab for each 12 classes from IV - VI inclusive
-Storage Area	400	
Music/Art-	1000 -1200	- inclusive of reading room & workroom
Infirmary-		- 24' length
Admin. Area	350 -400	- inclusive of principal's office, general office, washroom, and storage
Staff Area & Workroom	550	
Service Area		- for janitor's storage and sink area for each 12 teaching stations.
Gymnasium-Auditorium	2400	- 14' ceiling; plus storage space, dressing rooms, and stage (possibly folding)

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[1] The Organization of Instruction for New Brunswick Publis Schools and other Related information, N.B. Department of Education, April, 1968.

Opinion is expressed that most industrial courses should have at least 750 sq. ft. facilities; automotives might have a minimum of 900 sq. ft. and storage of 1500 sq. ft. should be available for them. It is also noted that Business Education courses warrant at least 85 sq. ft. per student in the classrooms. These are subject to approval according to the total enrolment of the school. The figures above suggest minimum space of many facilities which may be increases in size or number according to the number of students.

The approval of plans includes acceptance of the instructional facilities and the supplementary areas for a gross area for a proposed enrolment. This results in suggesting a certain area per student for different schools and different programs. For example, the figure might vary from 65 - 80 sq. ft. for elementary, 92½ to 114 sq. ft. for junior high, and from 168 to 178 sq. ft. for secondary students in a small high school. For large high schools a smaller area per student would range from 119½ to 129½ sq. ft. Such totals are comprised of suggested allowable areas for various features as indicated below:

ELEMENTARY SCHOOLS

		---- Range -----	
Area	Sq. Ft.	Per	Pupil
Classrooms	24		
Seminar Rooms	1	to	1½
Material Resource Centre	3½		4½
Physical Education	12		16
Kitchen	½		1
Art-Science and/or music	3		
Administration	2		3
Teachers' Workroom and Lounge	2		
Health	1		
Corridors, Lobbies & Stairs	12		18
Service Area	2		3
Lavatories	2		3
	65	to	80 Sq. Ft.

JUNIOR HIGH SCHOOL:

Many facilities suggested are the same as for elementary; variations or additional facilities are suggested as follows:

Facility	Min. Area Sq. Ft.	
Teaching Theatre-		- to seat 60-80 pupils, terraced floor.
Admin. Area	600	
Workroom	300	- larger than for elementary
Library - -inclusive of reading room	3½ - 4½	- sq. ft. per pupil - to seat 7½% of enrolment inclusive of carrels and check-out station.
-washroom	200	
-seminar	180	
Gymnasium -	15 - 18	- per student enrolment inclusive of all associated space

SENIOR HIGH SCHOOL:

Facility	Min. Area Sq. Ft.	
Material Resources Centre -	4 - 4½	- sq. ft. per student - including seminar rooms, office, workroom, and reading rooms to seat 10% of enrolment.
Cafeteria		
-dining area	10 x 1/3	- of enrolment for cafeteria, study hall, assembly, and social centre. Include plus other areas for table storage, kitchen, and possibly small canteen as approved.
-office	100	
-storage	200	
-work centre	200	
Science -	1000	- 1 facility for each 200-225 pupils
-preparation	300 -400	Additional area may be approved for prepartion and storage (300-400 sq. ft.) and greenhouse area.
-dark room	100	
Theatre-	3½ - 4	- per pupil enrolment To seat 250 - 300 persons depending on enrolment. Should include stage, projection room, control room, and storage. Used for drama, music, team teaching, assembly.
Guidance & Admin.	1200 -2000	
Industrial Arts-)	From	- Suggested specifications available from Department upon request.
Home Economics-)	6 to 7	
Business Education-)	Sq. Ft.	

JUNIOR HIGH SCHOOLS

	----Range----		
Area	Sq. Ft.	Per	Pupil
Academic classrooms	24		
Seminar Rooms	1	to	1½
Teaching Theatre (s)	3		4
Material Resource Centre	3½		4½
Cafeteria (not required at all schools)	0		4
Kitchen	1		
Physical Education	15		18
Science Labatories	7		
Art and/or Music	3		
Administration	3		4
Teachers' Lounges and Washroom	2		3
Health	1		
Pupil Activities	1		
Lavatories	2		3
Service Area	2		3
Home Economics	6		7
Industrial Shops	6		7
Corridors, Stairs & Lobbies	12		18
	92½	to	114 Sq. Ft.

SENIOR HIGH SCHOOLS

Area	Sq. Ft.	Per Pupil	
	Up to 750 Pupils	1000-1500 Pupils	2000 Pupils and over
Academic Classrooms	22	22	22
Seminar Rooms	1	½-1	½
Teaching Theatres	2½	2½	2½
Material Resource Centre	4½	4	4
Cafeteria (including kitchen and chair storage)	5	4½	4½
Physical Education (including games area, lockers, showers, storage, etc.)	15	14	12
Theatre (including stage, storage, etc.)	4	3½	3½

Area	Sq. Ft. Up to 750 Pupils	Per Pupil 1000-1500 Pupils	2000 Pupils and over
Science Lab (including storage and preparation area)	7	7	6½
Language Laboratories	2	1½	1½
Music	2½	2	2
Art	2	2	1½
Administration (including guidance & first aid)	6	4½	4
Teachers' Lounges & Workroom	1½	1½	1½
Pupil Activities	1	1	1
Lavatories	2	2	2
Service areas	2	2	1½
Business Education	15	12	9
Home Economics	25	12 - 13	8
Industrial shops	33	23 - 25	17
Corridors (including stairs and lobbies	15 - 25	15 - 25	15 -25
	168 - 178 Sq. Ft. Per Pupil	136½ - 150 Sq. Ft. Per Pupil	136½ - 129½ Sq. Ft. Per Pupil

The scales suggested above are basic to establishing the gross area. As shown, the space per pupil declines significantly as the enrolment increases. Some that appear disproportionately large are involved with vocational programs where the suggested space per student is much larger than in the regular high school.[1] For example, home economics is usually included as part of the vocational program and thus may benefit from generous allowance of space.[2] For senior high schools spaces it is suggested that there might be a variation allowance of 5% for any individual area with total variation not to exceed 2%. Corridor allowances may need adjustment in considering the design of each project. Ventilation control is featured, though there is no air conditioning. A practical area may be considered for each school. Spaces for opportunity classes in elementary or Jr. high schools may also be considered for each individual school.

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[1] Vocational programs are included in comprehensive high schools. There are seven regional districts with about 33 high schools expecting to have vocational facilities, possibly with some federal assistance.

[2] The suggestions imply that for a school 7750 students the spaces for home economics and industrial arts would be 18750 and 24750 Sq. Ft. respectively. It is understood that some expenditures are subject to federal assistance.

A study committee has been established to examine the feasibility of public kindergartens. Currently, only private ones operate with little regulation yet.

PRINCE EDWARD ISLAND

In Prince Edward Island one principle of recognition of need implies that elementary schools, except in a few isolated areas, should have a minimum enrolment of 360 pupils and that conveyance services should increase the figure to about 650. The school board may request a building but the government will decide on the need, location, and nature and size of the facilities. No excess area is involved unless some special supplementary program at local expense is approved.

The Department has formulated a manual of guidelines concerning design and allowable spaces for the educational specifications it approves.[1] Spaces are identified as instructional or non-instructional in the total approval. The following are included:

Area	Sq. Ft.	
Classroom	768	
Science laboratories		- larger sizes being considered.
Multi-purpose rooms-		
- for music	1400	
-remedial, testing or other purpose	800	
-French program- if approved	1050	
-lecture room may be approved		
Library - 3 Sq. Ft. per pupil	4200	- Minimum - assumes a 600 pupil enrolment
	4900	- in a bilingual school. This space will include corridor space around open areas.
Gymnasium elementary school	Up to 5200	- Min. enrolment - 300 to 400 pupils
		- 22' ceiling min. Width - 60' Showers may be approved in an elementary school
high school	6000 and up	
Health Room	400	
Infirmary	400	- including washroom
Guidance Office	220	
Staff Washroom	Up to 900	- as approved
Lounge	500	
Offices	Up to 900	- as approved
Mechanical room -	Up to 4% of gross area	

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[1] P. E. I. School Design and Facilities Manual, June 9, 1971.

Actually, these are but guidelines as the Department of Education and Public Works finalize the specifications. Facilities are approved for home economics and commercial electives. Spaces are provided for kitchens, seminar groups, offices, and for the bus drivers. Buildings are designed for the convenience of community groups. Little is added beyond the needs for the school except that the kitchen and large foyers facilitate public use.

Noteworthy features of recent buildings include considerable terrazzo or similar floors, fold-up stages, large entrance foyers, extensive audio-visual equipment, and carpetting in commodious libraries. The libraries may benefit from part of the corridor space accruing to adjacent open area. Two new elementary schools[1] each have three or four sections or clusters of three teaching stations as the basis of recognition for an open area equivalent of 800 to 900 sq. ft. per classroom so that a three-room cluster must have at least one divider and track sufficient to enclose any teaching station. These areas have carpets and exterior exits. Each cluster has an associated teacher-planning office.

Space is provided in new regional high schools for industrial education rather than for unit shops for Industrial Arts in the standard comprehensive schools. Occupational course facilities are provided in junior and senior high schools and for those engaged in work orientation programs who are also engaged in work experience part time. Technical facilities are usually apart from regular high schools in space that accommodates adults as well in a manpower program after 4 P.M. Courses are available in housekeeping, wood construction, electricity, electronics, and metal work. Technical facilities may tend to lessen as the vocational schools become trade schools.

It is also significant that facilities for the mentally retarded are in the 16 regional high schools which encompass all attendance areas of the Province. Classrooms for the deaf are provided in junior and senior high schools. Accommodation for early childhood education is subject to approval by the Department.

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1. Vernon River Elementary and Montagu Elementary School.

NEWFOUNDLAND

The government of Newfoundland approves the plans for school buildings. Gross area may be about 60 sq. ft. per student although in some high schools the amount may be larger. This is particularly, true of those built with DREE assistance. Currently, the guidelines for approvals are in close accordance with those of the Government of Canada Accommodation Standards Manual (1970). The following are examples of specifications:

Facilities	Sq. Ft.	
Kindergartens		
daily enrolment of 40	800	-including cloakroom and washroom
daily enrolment of 50	1000	
Classroom for 35 pupils	800	Open spaces must incorporate space otherwise intended for corridors
Ancillary room		
1 for 6-12 room schools	800	More according to enrolment
1 art room for 12 or more classrooms	1000	Including storage
1 music room for 12 or more classrooms		As approved
Language - if required		As approved
Science lab 1 @	1200	+250 for storage
Over 200 pupils		
Warrants 2 @	1000	+180 for storage
Home Economics		
20 pupils groups		-extensive according to the program
Industrial Arts		
Elementary - over 4 rooms	1675	
Secondary - over 4 rooms	3600	
General Commercial room	900	
Typing room		
-Junior	1000	
-Senior	1200	
Business Machines	1200	+80 for storage
Agriculture	800	+180 for storage
Library		
-Elementary up to 6 rooms	800	+135 for each extra room
-Secondary for 500 pupils	1500	+3 Sq.Ft. per extra pupil
Activity Room		
2-3 room school	1600	A gym for small schools that could be later converted to classrooms
4-6 room school	2000	
Gymnasium		
Elementary (7+rooms)	4100	Stage (960) + storage 300 + P.E. Office and showers and dressing rooms
Secondary school 58' x 92' - 20' ceiling	5336	
Auditorium		
Min. -1500 pupils		

Facilities	Sq. Ft.	
Cafeteria		
- Kitchen		10 times 1/3 of enrolment 20% of cafeteria
Guidance Office		
Elementary	120	
High school	300	
Administration		
Principal	1.3	Per pupil
Vice Principal		As approved
Staff	100	+ 25 for each teacher over the first one.
Medical room	200	Minimum
Storage	100	Up to 500 + 40 for each classroom over 12 plus janitorial storage - (120)
Janitor's storage	120	for each 6000 sq. ft. on each floor
Washrooms		Number of fixtures according to size of school 2 - 23 and 4 up to 30.
Mechanical room		Need as approved

Other directives pertain to corridors, stairways, entrances, and exits. The areas are specified as maximums and any deviation from them must have approval. They apply to all school buildings built by the federal government and they have so far been adopted by Newfoundland as guidelines for approval of plans submitted by school authorities.

GENERAL OBSERVATIONS

Basically, every province approves the nature and extent of instructional facilities for a specific number of students. Then additional amounts of space are acknowledged to determine the maximum gross area which is usually conditioned by the ratio of the instructional area approved. Specific non-instructional features are acknowledged in most provinces. In Ontario the recognized ones are incorporated with the approved instructional facilities to establish the accommodation Unit Factors. Many provinces influence location of schools by emphasizing they must be of such minimum size as to ensure an effective program and economical construction. Many also approve the built-in equipment and mechanical services.

Comparisons are difficult although some comparable elements pertain to classrooms, laboratories, physical education, and libraries. Variations arise from different curricular purposes.

Features of instructional facilities are, presumably, recognized out of regard for the nature of the school courses in a province. One which sets a high priority on physical education may approve for support larger areas with more auxiliary space and swimming pools than another. Again, the nature of an Industrial Arts program with emphasis on exploration into many fields may justify more area than one which concentrates on fewer activities. Similar observations might apply to acknowledged space for music, creative arts, or home economics. Thus, though spaces for particular courses may appear restricted in some areas they may be adequate for the course and there may be larger spaces for some other subject in the building.

Regardless of the variation in facilities and distribution of space, it appears that the range of space per student is fairly comparable throughout the country. Figures of 65 to 75 sq. ft. in elementary to 95 in junior high, and 100 to 115 in secondary schools with extra allowance in vocational facilities are common. Area per pupil varies in the approved facilities as a large enrolment usually means less space per student and also more space may be needed per student in senior high schools than in lower grade levels.

Pupil-loading varies. The charts show allocations from 35 to 30 students in elementary grades and from 30 to 20 in the high schools with smaller numbers stipulated for some special facilities. This applies to classrooms and is different if all teaching areas are counted. Available accommodation is related to school systems' adherence to the pupil-loading intended. Though buildings are approved for a stipulated number of pupils some schools enrol fewer pupils in them and thus, apparently, reduce the provision of accommodation. Emphasis on the intended space allottment is significant when applications for more space are considered in relation to the space available if utilized as already approved.

Classrooms generally approximate 750 sq. ft. and laboratories, generally regarded as home-rooms, range from 1000 to 1300 sq. ft. All provinces approve auxiliary space either by ancillary rooms, special subject rooms or large divisible areas such as auditoriums, lunch rooms or activity spaces.

Five provinces approve kindergarten facilities as part of the school organization and support is given for facilities that may be used by two groups daily.[1] These pupils are not usually included in computing allowable space for libraries or multi-purpose rooms. Alberta has not approved pre-school facilities unless there has been federal support under some tuition agreement.[2] Many private associations operate kindergartens, pre-school, or day-care centers and arrange for accommodation in any available space in a school or in temporary rented quarters. Repeated requests for support have prompted a lowering of the school-entrance age for grant purposes and the support of two pilot projects in Calgary and Edmonton.[3]

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1. The facilities are used extensively though there is emphasis on outdoor trips, use of community resources and familiarity with the environment. Much activity, audio-visual aids and group socialization require much use of the space.

2. Kindergartens may be operated at National Defence Schools or at schools where the federal government has provided capital support for the instruction of Indian pupils.

3. (a) Alberta has lowered the entrance age; Nova Scotia accepts entrants who are five years by October 1.

(b) Cities, particularly, asked for approval of kindergarten classes as well as a large school division that indicated pre-school classes might promote school readiness of pupils of native ancestry. The Department accepted two proposals for conducting experimental programs for inner-city pre-school children for which some appraisal may be made. $50,000 was provided for each as an innovative project. One is the Inglewood Community Pre-School Pilot Project in Calgary.

Lunch rooms are approved, even in elementary schools in most provinces and are intended to serve additional uses.[1] Alberta gives support for them only in senior high schools with enrolments of 700 or more and also expects the room to serve as a study-hall or for other ancillary purposes. Some provinces have provisions for subdivisions. Kitchens are not generally provided except where a food services course is part of the program.

There has been a great expansion of libraries or the expansion of these into resources centers. Developing ideas about their use for printed and non-print materials and very diverse information have emphasized desire for increased space for independent study, small group activity and for reading, listening, viewing, and producing. Charge desks, work spaces, seminar rooms, adjustable shelving, periodicals, maps, and moveable equipment are featured in new construction. Carpets, acoustic treatments, improved lighting, and quiet furniture improve the appearance and the control of distracting noise.

Approved areas indicate a minimum of a classroom size for small schools or a usual range of from 3 sq. ft. per elementary student to 3½ sq. ft. in secondary schools. In British Columbia the elementary allotment is 2½ sq. f and in New Brunswick secondary schools it is 4 sq. ft. In Ontario a recent revision increased the space to 5 sq. ft. in large schools. Desire is often expressed for larger libraries, such as space for 30 per cent of the school enrolment. Widespread opinion of approving authorities exists that if larger instructional media centers were approved then the number of classrooms, or the open area around the library, might be correspondingly reduced. An opposing view is that pupils may come from many classes so that particular rooms are vacant less than the numbers in the library might indicate. Excess area, where permitted, is frequently for unsupported library space.

The minimum size of gymnasiums appears fairly comparable but sizes vary considerably among provinces as enrolments and grade levels rise for approval of many features.[2]

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1. Opinion exists that this facility is important for children who may have been conveyed some distance and have had early or limited breakfasts; moreover, it provides appropriate supervised space which is valuable for other uses.
2. Some provinces approve large facilities and also others such as supplementa gyms, field houses, tracks, or swimming pools only in the very large school recognized by government policy. Physical education facilities in large schools of Quebec, Ontario, and British Columbia are larger than in other provinces.

Specialists in physical education familiar with facilities in large teacher-education institutions repeatedly urge that school gymnasiums and service areas should be enlarged. Certainly, changing curricular concepts have emphasized such desires. In several provinces there are provisions for auxiliary space or an activity room if an additional gymnasium or addition to an existing one is not approved.

Storage area is universally approved in relation to administrative and instructional facilities. Subdivision of the two classes of space according to local desire sometimes results in some storage areas being used for teachers' workrooms or other purposes. This practice might be construed as implying that the allowance is generous or that some other unapproved area is wanted more. Occasionally, however, infirmaries are partly used for storage.

Building requests and approvals generally reflect a single-purpose concept of instructional facilities even in some of the "open area" sections. The definition of these may reflect educators' aspirations but full utilization of space is essential. Ancillary areas are intended to serve many uses.

Science laboratories are approved as home rooms. Ancillary areas are intended to serve many uses. This might also be said about some vocational facilities such as for the commercial programs frequently provided.

Space for business machines, as in Alberta, might be developed into more multi-use, particularly, when there is concern that the subject not be taught in isolation. In addition to this, new types of machines may need assessment. In many schools the merchandising area might be reorganized so that a section for displays would not hinder the use of the remaining space for other subject instruction. Possibly a committee should now survey the field of business education with a view to recommending revisions relative to equipment and space.

In most provinces many large composite or comprehensive high schools, whether urban or regional, provide vocational programs in technical, industrial arts, or home economics courses that are integrated with the school program. It is intended that the vocational students may acquire skills as prepa-aration for some apprenticeship or employment in a specific field while they are taking academic or general education. Programs differ widely

though vocational education generally implies that a student may spend one-half his time in vocational and related courses. The variation in emphasis is reflected in extensive technical programs with very large facilities and sophisticated equipment as contrasted with those for industrial education coupled with industrial arts and those for occupational courses and facilities categorized as trade schools. It is frequently asserted that vocational education emphasizes specific, concrete, and real experiences as distinguished from the academic abstractions or vicarious experiences of academic schools. However, vocational students take general courses as well. A further balance might be effected in this regard. It is generally considered socially advantageous for them to be associated with others in the comprehensive schools.[1] Furthermore, the operation of provincial vocational schools apart from the regular high schools' promotes some duplication of courses and required space.[2] However, practice varies as to whether vocational facilities should be a feature of high schools, separate provincial schools, or Junior Colleges.

The programs and enrolments are always basic to the approval of desired facilities. Most were sized for classes ranging from 16 to 20 pupils. Many different approaches concerning the nature of vocational courses and the time devoted to them as well as the various interpretations about related courses and the use of vocational facilities for general electives make comparisons of accommodation difficult. In some provinces the technical facilities are limited for about seven main classes of technology[3] for a cluster plan of industrial education. In others, exploratory courses and occupational programs for both boys and girls influence the extent of facilities. Space for vocational facilities in Alberta appears very generous although there are many approved courses.

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1. There has been some concern that a requirement to secure a high school diploma with a vocational pattern has imposed three-year time requirement on pupils who want vocational training sooner. Many pupils seek continued education in a different institution than a high school where they are disinclined to study non-vocational subjects requiring 50% of their time. In regular high schools many treat the vocational courses as electives and do not continue into the advanced ones. In fact, many vocationally-minded students seek training elsewhere and view achievement in school as a means of securing employment so as to get established, if necessary, as an apprentice.

2. An example is in Nova Scotia.

3. For example, such large groupings as weaponry, manufacturing, oceanography, materials, communications, and services.

Enrolment in the senior courses has not always been sustained[1] so that some facilities are now utilized in a reorganized program of industrial education which may include some phases of industrial arts programs. Some of the facilities have been converted.

A further survey of available spaces may help considerations for their utilization and for approvals for additional ones. Several years of experience with equipment and space in all phases of vocational education should facilitate a realistic appraisal of desired facilities for future recognition.

Apart from relationships with vocational space, facilities for Industrial Arts or Home Economics are generally approved throughout the country if sufficient enrolments warrant considerable use.

Space for home economics is reasonably comparable for the fundamental courses. However, second stations are not always as large as an approved second facility.[2] For example, Alberta may recognize a second station of 1000 sq. ft. to be added to the initial one of 1400 sq. ft. whereas Ontario or British Columbia may approve a second facility of 1400 sq. ft. for Sewing and Textiles to supplement the original one to be used for Foods and Nutrition. Names of programs may be confusing. The Community Food Services course in British may be comparable to the technical-vocational course in Alberta and the last recommended space in New Brunswick would be for girls taking Home Economics on a vocational program rather than as a standard elective.

Facilities for mentally and physically handicapped vary. Schools in most provinces include "opportunity rooms" for the educable mentally retarded.[3] For the more seriously retarded, facilities are more limited. In British Columbia about two dozen schools include such classes and there are about thirty-five more in schools operated by the Association for the Mentally Retarded. In Alberta capital grants may be given for retarded classes as approved by the Director of Special Services.

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1. Only part of the students who take first-year technical courses continue into the next year's vocational program. Results do not show large, or even significant, graduation into post-secondary courses or into apprenticeship or the trades. The situation has occasioned serious concern about the use of extensive space and equipment.

2. Curriculum committees point out some existing inadequacies. Recently, a group in Alberta recommended that there should be support for furniture and equipment and a 10% depreciation allowance for them and also more area for storage and office space. In addition greater financial support is desired because of the need for electrical and plumbing facilities as well as for built-in cupboards and counters.

3. Prince Edward Island has such classes in each of its 16 regional schools.

Facilities may be recognized for other special classes or special schools[1] if such instructional need has been previously approved by the Associate Deputy Minister. Some boards, including ones in Alberta sponsor private associations conducting special classes and 90 per cent of the cost of facilities is provided up to $7200 per 425 sq. ft. of approved area. The current recent provision of an additional million dollars in Alberta as assistance grants may accelerate establishment of more facilities.

There are very few facilities in the schools for paraplegic pupils or others with physical handicaps. This may arise from the responsibilities assumed by various Departments of Health[2] and from the efforts of private associations providing special classes for those with cerebral palsy, aphasia, or severe mental problems. Some boards pay fees for the attendance of their pupils at such privately organized schools.[3] A few boards have established some special classes.[4] Some others have assumed the operation of schools formerly operated by private agencies.[5] Opinion has prevailed that many needs require health services or special attention beyond the scope of the regular schools. However, many of the special classes or handicapped pupils in these schools operate in spaces designed as regular classrooms. Facilities for accommodating the physically handicapped, particularly, might be improved by inclusion of ramps and elevators where necessary and by enlarging the entrance and a cubicle as well as providing other conveniences in the lavatories.[6]

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[1] Section 25, School Buildings Regulations. The Wagner, Shaughnessy, or Van Horne are examples of such schools.

[2] Departments of Health operate schools in most provinces; examples are the Jericho School in British Columbia, Red Deer Home and also the School for the Deaf in Alberta, special schools in Ontario such as at Smith Falls, or several in the Maritimes.

[3] The Alberta Government operates a School for the Deaf and for may years has pupils with poor eyesight sent to the Jericho School in British Columbia or to the Ontario School for the Blind. Boards receive support for sending pupils to the Winnifred Stewart School or the Robin Hood School. Prince Edward Island pays $4000 for each pupil attending the Interprovincial School for the Deaf at Amherst and $3300 for each child attending the Halifax School for the Blind. It also pays for those with cerebral palsy to attend a special class in Charlottetown.

[4] There are classes for the deaf in junior and senior high schools of Prince Edward Island.

[5] Examples in Alberta are the Dorothy Gooder School, Christine Meikle School, Peace School of Hope, or the Glenrose Hospital.

[6] Guidance is provided in Supplement 5 of the National Building Code, 1970.

Decreasing enrolments throughout the country have engendered special attention to building needs. Projected enrolments have been acknowledged for eligible space but such anticipated enrolments should have a realistic relationship to the actual number who will appear in a certain period of time. However, enrolments have dropped significantly in many areas.[1] Over 60 per cent of Ontario's 25 largest systems had fewer pupils last September. Toronto's enrolment dropped 4500 in 1971 and 8000 in 1972. Montreal's enrolment decreased this current year by over 9000 pupils. Smaller enrolments and fewer entrants than in the previous year were evident in scattered locations throughout the country.[2] In Alberta there were 35000 beginners as compared with 39000 four years ago. Birth rates have dropped by about 33 per cent the last decade so that elementary enrolment may show a decline up to 25 per cent in the next six years and this may be reflected in a still greater decrease a few years later in high schools.[3]

Overall accommodation needs for elementary pupils may be temporary and as space there becomes vacated it may be used by senior students thus lessening the demand for more facilities.[4]

Though the national population increase has been about 8 per cent in the past five years much of the growth and mobility may be evident in suburbs at the expense of "core cities" and small towns or rural communities. Results are noticeable in vacated classrooms. Inventories of these have prompted proposals of their use as an alternative to building more. However, many may be significantly distant from attendance areas of need and the cost of conveying pupils to them may be greater over a very few years than construction where the need exists. However, vacant portables and others that might be vacated should serve to advantage in this situation.

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[1] Of about 80 centers with population of 5000 or over and unchanged boundaries in the past 5 years, enrolment declined 5 per cent in 25 of them and 10 per cent in another 10 of them. In Quebec 11 of these centers included 4 with a 10 per cent decline. Ontario had 4 such centers and 5 centers in the Western provinces and also in the Maritimes showed similar declines, Population is under 20,000 in 60 of the centers and 8 of the largest 14 cities are in Quebec. Current expectations in all provinces are that enrolments will decline and that the impact of birth rates must be clearly considered in any projected figures for school population.

[2] Various statistical reports substantiate this conclusion and some indicate only 70 per cent of current accommodation will be needed in a few years. (Quoted from New Dimensions, February, 1972.)

[3] Birth rates have reportedly dropped 4% from 17.4 per thousand in 1970 to 17.0 in 1971 and the monthly reports in 1972 show a still larger decline.

[4] Quebec has noted this in the use of portables for high schools where the incoming enrolment may decrease.

Occasionally, space has been vacated in pursuing centralization policies. But this can be controlled with proper consideration for the costs of renovating or maintaining the vacated space and appropriate regard for the curricular benefits in a larger school and the availability of teachers. Frequently, the situation has arisen from such a reduction in the school population of an area as to impel selection of some alternative. This may be applicable in rural points or in the inner core of large urban centers. The result has been a large number of extra classrooms.[1] The mobility of people emphasizes changing needs, some of which can be accommodated by available portables. The needs for school accommodation still occur in the periphery of cities and in the unscheduled suburban development that demands simultaneous accommodation according to the anticipated growth in many areas all of which may not grow at the same rate. Demands for immediate accommodation have sometimes been overwhelming. However, past trends in population growth are less dependable in projecting future school enrolments. It is hard to know what changing attitudes or health considerations may influence changes. But the current lack of sure prediction may prompt more restraint on new building and more emphasis on other alternatives, such as phase development, "starter schools", or use of other available space elsewhere.

Practices throughout the country indicate that approval for building has regarded overall needs, regional conditions, and attendance areas. Some provinces influence the size of the school and the location. This avoids close proximity that permits duplication of many facilities. In a few others, such as Alberta, boards request schools of varying sizes according to their desires about location and attendance areas.[2]

Secondary students travel farther and most of their schools have been rated higher than current enrolments; there may be little need of more recognition of need in cities for some time as there may be fewer incoming students than expected.

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1. A recurring problem is what to do with many of the empty classrooms: sometimes extra programs are suggested, or classes for culturally deprived children, or handicapped pupils, or use of the rooms by pupils from other areas.

2. In Edmonton, a planning branch of the administration is reportedly seeking the incorporation of a linear concept in development to secure organization within an attendance area without increasing the walking distance to school. A Regional Planning Commission is involved with the city concerning subdivisions.

As indicated before, approval of building needs must depend on the number of pupils involved. The enrolment establishes different categories of schools that warrant differences in approved facilities and in the space per pupil.[1] Many requests are for larger areas[2] or for accommodation of pupils who have been moved from some other center. In Alberta regulations assert that recognition of new space should only be for more pupils for whom the school board has responsibility by virtue of residence or approved tuition agreement. It is further implied that new space should not be approved for pupils from vacated schools unless there is previous Ministerial approval for closure of all or part of the school.[3] Financial Regulations state that debentures will cease to be supported on a building that becomes used for some other purpose than that for which the debentures were issued.[4]

Approvals must necessarily depend on the utilization of available facilities. This should imply coordination with the effective utilization of staff as well. Some inventory or bank of specifications as automated data for quick retrieval should serve to advantage for all schools. It is suggested that computerizing timetables for students and teachers and the use of gymnasiums might be applied also to the use of all instructional areas to facilitate their maximal use.

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1. For example, the following table shows varying space per student according to the size and enrolment of the school:
Size of School
Elementary:

No. of Rooms	6	8	10	12	14	16	18	20	22	24
No. of Pupils assumed	180	240	300	360	420	480	540	600	660	720
Space per Elementary pupil	80.1	81	74.8	70.7	76.6	72.7	70.1	67.3	68.1	66.8
Junior High										
-Academic	85	96.3	88.5	82	83.8	80.9	77	76.6	74.6	73.5
-Including Ind. Arts & Home Ec.		125.5	111.8	101.4	109.2	103.1	97.1	94.4	91.8	88.3

2. A reprint from the Eighth Annual Review of the Economic Council of Canada asserts that "Increased allocation of resources to improvement of school facilities or further reduction of student teacher ratios would be relatively ineffective in improving output". It is further indicated that "factors such as adequacy of libraries and school equipment . . . had relatively little impact." Reported from output Measurements for Education, New Dimension, November 1971 - Acting Director of Information, Ontario Department of Education.

3. Sections 26 and 27 of the School Building Regulations.

4. Section 12, The School Foundation Program Fund Regulations.

There has been widespread acceptance of frequent expressions that the high quality of the physical environment is significantly conducive to the learning attitudes of students.[1] It is hard to know what future requirements may be. Future schools may need to use much more technological equipment and computer-assisted learning all of which may affect the building approvals. Many facilities now vary according to provincial programs; some common features are indicated, however, in the following chart.

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[1] It has been stated that shabby facilities may contribute to dissatisfaction and reflect a certain social churlishness toward teachers and pupils - a kind of indifference to the contributing influence of a good environment on the positive outlook of the learners.

It may also be noteworthy that a recent O.I.S.E. Report indicates that buildings and facilities have no effect as an input factor on the output of students.

SQ. FT. AREAS FOR DIFFERENT FACILITIES

	BRITISH COLUMBIA	ALBERTA	SASK.	MANITOBA	ONTARIO	QUEBEC	NOVA SCOTIA	NEW BRUNSWICK Suggested	PRINCE EDWARD ISLAND	NEWFOUNDLAND Suggested
Classrooms-	768	750	700 - 768	750	750	750	720 - 750	700	768	800
Kindergartens	895	0	Being Considered	1000 (per 50 pupils)	700 - 1200	If space exits	0	0	0	800 - 1000
Science Rooms (Usually home rooms)										
-Elementary	0	1000	700 to 1050	1000	700 - 850	1000				
-High School	1232	1300 Plus Storage	Plus storage	1000		Plus Storage	1200 - 1300	1000 Plus Storage	768	1000 - 1200
Ancillary-	(Over 12 rooms)	750 - 6000 Usually 1000 per room		3 ½ sq.ft. per pupil	Varies: 800 or 900 to 1400 for different groups		As approved	1000 to 1200	800 to 1400 As approved	800 to 1000 plus more for larger enrol.
Art room	895		800 to 900			1100 to 1200				
Music	1000 - 2352									
Instructional Materials Center (Library)										
-elementary	Min. size or 2½ over that plus seminar rooms	Min. sizes up to 700 pupils and 3 sq. ft. per pupil over that 3½	varies. accom. for 15 - 20% of enrol.	Min 750 3½ sq ft. per pupil	schedule min. 1500 approx. 5 sq. ft. per pupil	approx. 3½ sq. ft. per pupil	Appox. 3½ sq.ft. per over spec. enrol.	3½ to 4½ sq.ft. per student over specific enrol.	4200 to 4900 3 sq. ft. over specific enrol.	Elem. 800 min.
-High School			"	"	"	"	"	"	"	1500 min. up to 500 pupils plus 3 sq.ft. per pupil over 500.
Gymnasium		Schedule 2400 to 5400 plus more for large enrolment	Schedule 1500 to 8400 in large school serving as aud.	Schedule 2400 to 10,800	Schedule	Schedule 2400 to 4800 for schools up to 24 rooms much more in large sr. schools		2400 plus more according to enrol.	Min. enrol. 300 pup. 5200 to 6000 plus more for larger enrolments.	4100 to 5336 plus storage
-stage		800 - 1000	if approved	0				yes		Yes
-showers & dressing	if approved	H.S. only	if approved							Yes
Activity rooms		1600					If approved	Occupational & Voc. courses	Occupational courses	1600 to 2000
Industrial arts		2800 - 3200	1600 to 2400	2800 plus approved amts.	1300 to 2500	Occupational courses				1675 - 3600
Home Economics	1400 to 1792	1400	1200	1400 to 1600	1100 to 1300					As approved

CHAPTER V

RELOCATABLE BUILDINGS AND RENOVATIONS

Practice has grown throughout the country in the last decade of approving and supporting some or all the cost of portable classrooms. These have been intended for temporary conditions, economy of time in emergency, avoidance of high construction costs for small additions, or use until an increase in enrolment warrants much larger additions that can be economically built. This is common in Alberta and also in British Columbia which requires the use of portables unless new construction warrants at least four classrooms. Overcrowded enrolments in the Victoria S.D. required the use of 16 of its 56 portables in five of the secondary schools last year. Large portables rooms have been developed there for band work and other features of the music program. Some portables have been built by the school districts in the three western provinces.

The specifications for several hundred portables have been approved for use in Alberta. Edmonton and Calgary have about one-half of them for use when increased enrolment or new suburbs need immediate accommodation. The Regulations provide for approval of financial support for purchasing or for transferring unused ones to another school authority in need of some.[1] The amount of support is limited to $12.00 a sq. ft. of the approved area. For new areas of city development, portables are sometimes recognized as a core complex to which other movable units might be plugged in or later removed. The initial costs and community reluctance to regard these as permanent-type facilities have militated against wide acceptance of the practice. The alternative has been to provide a "starter school" to which classrooms may later be added. In areas of unpredictable growth new buildings might have a patio on which portables could later be attached to the rest of the building according to fire regulations. Portables may be single, double, or multiple units of relocatable nature. Frequently, they are integrated with existing buildings for more convenient use of other facilities but many are located separately, particularly, if their time of need there is limited.

Some of the few relocatable gymnasiums approved in a renovation program occasioned concern because their specifications extended their cost

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[1] Section 31, School Building Regulations, 1970. There are about 600 portables in the Province.

beyond that of new construction and many of the components could not be transferred.

Full utilization of portables challenges recurring attention, particularly, where they have fulfilled their acknowledged need. Frequently, districts wish to retain them for ancillary rooms, storage, community purposes, or other uses for which space would not ordinarly be approved. Recognition of need for a portable elsewhere may be conditioned by the requirement that the district secure an unused one from another area. Occasionally, boards leased portables independently on a purchase-option basis which might have a sale price adjustment if recognition of need were given later.

Trailer classrooms have been approved for isolated areas where roads have limited transportation to units of twelve-foot widths.

Portable classrooms are not used extensively in Saskatchewan. The various cities have some which can be moved as needed. Some of these have been combined as a four or six-room complex. Throughout the 66 school units there are about 20 one-room portables. The cost is about $10,500 each. Usually, the units are attached to an existing building. The public school systems of Saskatoon and Regina have a small number. The Regina Separate School District has had approval and support for building 26 portables according to its own structural plans. These are distinctly portable with steel beams under them to facilitate effective raising and quick transfer whereas many relocatable classrooms frequently require more time for moving.

A few boards have built relocatable additions. The Herbert School Unit established such a four-room Armco structure at Moral two years ago for less than $50,000. Some vacant two or four-room frame school buildings have been relocated and put in use at costs ranging from thirty to seventy percent of the cost of new construction. This has occurred occasionally in Alberta also.

Some portable gymnasiums have been secured in both Saskatchewan and Alberta for short-time use at a location. Favor for them has declined because much cannot be salvaged if they are to be moved. The alternative is to recognize instead a small gymnasium-activity room with limited facilities.

Manitoba has some one-room portable units provided as temporary space until permanent facilities are provided. Frequently, they are used

as auxiliary space for electives. These relocatable units can be readily converted to houses and sold as such. Winnipeg has only four single-classroom units that may be moved from time to time. Most of the 300 portables are in units of combined classrooms which may serve for some time. There are no large relocatable buildings except a few engineered steel buildings that may be used as gymnasiums.

Expenditure for portables or trailer classrooms in Ontario is deemed to be expenditure upon "permanent improvements" and is therefore subject to the same restraints as expenditure upon conventional accommodation. There must have been approval of need as well as approval of financing by a five-year capital program or by debenture borrowing before tenders can be called. Portables are acknowledged for use in emergency situations or where permanent building is currently impracticable or where uncertain school enrolments may mean that the portable would need to be moved in three years or so. Occasionally, as in Alberta, some were recognized in lieu of renovations. Approval is subject to certain specifications such as a minimum inside floor space of 725 sq. ft. and 75 sq. ft. of window area. Maximum financial support has been $7000 for purchase and $600 for installation plus $1000 for furniture and equipment. A grant may also be approved for the purchase of leased or second-hand portables on some depreciated valuation.

Many are in use; for example, Toronto has about 1200. Suggested layout plans are available from the Department for assembling relocatable units into one complex acceptable to various approving authorities.

Trailer classrooms or mobile facilities may be supported for isolated communities where the anticipated life-span may be less than 10 years. The approved specifications include integral washroom facilities. The maximum approved cost is $11,000 for purchase and installation including water supply and sewage disposal. A further $1000 is allowed for furniture and equipment.

Quebec has featured another dimension to the use of portables for peak periods of enrolment. For example, a high school of 2,000 pupils, may need more room for its 2000 students but if there are only 1500 elementary students expected to come to the high school within a few years, then portables will be approved for the current need of the high school. There too, about half a dozen portable gymnasiums are in use in elementary and secondary schools with requests for another ten if funds become available.

As in Alberta, it is considered that only about 70 percent of the value is recoverable if transfer is necessary.

Relocatable schools are being widely used in Nova Scotia in areas of rapid growth. Requests for them must be approved for support of costs. Many are standardized and comparatively inexpensive. Some may be combined as the first phase of a project as in Sackville where ten are in a complex with four more expected to be added as a second phase until another school such as Tantramar is finished. Should a complex exceed a cost of $60,000 the Department of Public Works must approve the plans and the finished project.

Prince Edward Island has about 117 portable classrooms. In 1969 the government financed purchase of 30 single ones and 12 double units. It secured another 43 single ones in 1970 and 20 more the next year to be used in emergency situations. Costs have averaged about $10,000, per classroom.

The increased use of portable and relocatable facilities has stimulated more competitive production with refined specifications. Some precut relocatables are delivered with electrical and plumbing facilities and can be assembled quickly. Many have aluminum windows and siding as well as pre-finished panelling and trim.

Another feature of relocatables has been the moving of vacated one or multiple-room schools to new areas where enrolment has increased. For example, in Saskatchewan two to four-room frame buildings and even one masonry one were moved during the past three years. Costs were from 30 to 70 percent of new construction costs.

A noteworthy observation is that portables have been intended as temporary facilities for transitory conditions. They might be transferred as occasion demands although the construction of some limits the number of times they may be moved. They are not comparable to usual building in respect of temperature control, ventilation, or finishing. Criticism often occurs when they are left to serve long periods of time as semi-permanent structures. The approvals given because of many developing situations may result in excessive numbers of such buildings and a problem arises concerning the use of those that have become vacant because of permanent construction or declining need.

RENOVATIONS

Increasing expenditure for more accommodation and specialized facilities and a growing shortage of funds have emphasized rehabilitating existing buildings for extending their life and changing curricular functions. Many inadequate facilities were noted for science, physical education, library services, or other new program demands. All provinces have accepted this viewpoint and approved renovations with varying degrees of financial assistance.

Throughout the country alterations have usually been approved for support in a school to which an addition is being constructed.[1] This generally pertains to converting existing space to serve some other approved purpose such as changing some classrooms or a small gymnasium to a library materials center or some area to a science laboratory. Much of this is in response to new program needs. Increased enrolments require more accommodation in an existing building because there is no other available site.

The general connotation of renovations pertains to possible provision in older schools of instructional and administrative facilities similar to those recognized in new schools and including such items as are basic to extending the life and safety of the buildings as well as improving its functional efficiency. It may be distinguished from mere maintenance items and general upgrading.

The structural soundness basic to the life expectancy of a building as well as the degree of obsolescence of electrical, mechanical services, or other features necessarily influence decision about renovations or replacement. Other considerations pertain to the possibility of improving the instructional functions, revised building codes, and the costs involved as compared to those for replacement. In addition the extended life expectancy of the building must be regarded.

Cost must be considered if functional goals cannot be achieved without clearing out whole sections and providing reinforcement instead of bearing walls. It must also be considered in respect of loss of space, desired facilities, flexibility, operating expenses, and the actual construction estimate. Other than the two provinces[2] which

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[1] Alberta has for some time approved such renovations to a maximum amount of support according to Sec. 22 (5) of the Building Regulations. All provinces approve the proposed improvements and the amount of costs to be supported.

[2] New Brunswick and Prince Edward Island.

provide construction, all others approve a maximum amount of support for approved renovations. Opinion varies as to the amounts. Some limit support up to one-half the unit figure of support for new construction, unless there are very extenuating circumstances. This often has some relationship to the age of the building as is reflected in larger allowances elsewhere,[1] some of which may be little less than for new construction. However, the allowance applies to the renovated area and should not be compared to replacement costs that might involve the whole building unless a very large part of the building is involved or cannot be expected to long endure. The most prevalent idea that if costs of renovations applying to a very large section of an old building exceed 50 percent then possibly replacement is more valid, particularly, as there are often unforeseen costs as well. It is hard to get firm contract prices on extensive modernization unless a large proposal includes removing much of the inside sections. Previous investigation or feasibility studies are important in respect of alteration or replacement. Other influences for renovation include local pressures, specialized needs, and community sentiment.

In British Columbia support is provided as support for approved major renovations in the same manner as for new construction. Some sections may involve costs in excess of those for new facilities in a replaced building. The approved amount may be increased by 6 percent for supported architect's fees. In both British Columbia and Alberta examination of the facilities usually precedes an estimate of costs or negotiation of a support price. In both, a maintenance crew may, if it is feasible, renovate some facilities for an approved support. Advantage accrues from its general experience, familiarity with the schools, and scheduling the work in relation to the time of school operation.

In 1970, Alberta initiated support up to two millions for approved school renovations in Edmonton and Calgary. This policy was renewed in 1971 with a further two millions of available debenture funds for approved renovations throughout the rest of the province. Many praiseworthy improvements, including provision of better libraries, laboratories, and other instructional facilities, were effected. Some boards made other improvements

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[1] Renovations costs some facilities in Ontario were as much or more than allowance for the new facility. A few in Alberta approximated two-thirds of the support figure for a new facility. Cost estimates for the desired work are usually provided for approval. Some schools are very old as in Halifax or in Boston where prices for renovations are quoted.

simultaneously at their own expense. On rare occasions, a large amount of approved costs prompted districts to seek application of that amount to the cost of replacements for which they paid the remainder. Support was not intended for general upgrading though some buildings had an accumulated need for extensive repairs.

However, to extend the life expectancy of old buildings, supported debenture support has been proposed in 1972 for other improvements on a shared cost with the districts.[1] Approvals is for major structural needs but not for maintenance items, equipment, or supplies. The condition of buildings is considered as well as the age because some constructed in the forties or early fifties have not endured as well as some built twenty or thirty years earlier.

Approved renovations have been supported in some old Saskatchewan schools such as at Moose Jaw where there were many over fifty years of age. Costs were less than half of those for new buildings. Grants were recognized for major renovations on the same basis as for new construction. However, for the most part renovation support arises from maintenance grants included in the approved operational budget. Manitoba has also, through some maintenance inspection, encouraged consistent building care to save renovation costs as little is done to modernize old buildings where no extra space is needed. However, in the case of additions about 15 percent of the capital expenditure last year was for renovations in existing buildings.

Ontario's recognition of major alterations pertains to loss of eligible space or conversion of it to non-eligible area, as well as enlargement of eligible space by alteration and/or addition. Approval of support applies to construction in respect of eligible space or requirements of health or fire regulations. It does not include general upgrading or maintenance nor work resulting in more space than the approved maximum net functional floor area unless special recognition is secured.

Requests for alterations must include much of the information required in applications for new school buildings. Cost estimates should reflect those of the professional consultant as well as those occasioned by requests of the Ontario Fire Marshall.

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[1] The School Life Expectancy Progam. (S.L.E.P.)

The support is 90 percent of the gross cost of the approved alterations including fees and a small contingency sum but exclusive of expenses for furniture and equipment. Support may be granted separately for approved furniture and equipment for additional areas. If approved alterations result in loss of existing eligible space the approved costs may be reduced according to the depreciated value of the reduced area. Similar principles of depreciation apply also to replacement of old buildings.

The Directorate of Buildings and Equipment in Quebec approves all repairs on school buildings according to the cost involved. Extensive proposals are envisaged for some centers such as Montreal where it is estimated that 22 millions will be needed in the next five years for sites, equipment, and major repairs.

In the Maritimes support is given in Nova Scotia for the actual cost of substantial alterations of existing facilities and for the major repairs or renovation of buildings the cost of which is determined by the Minister to be a capital expense. Major repairs may pertain to heating systems, lights, or roofs rather than to mere maintenance items. The procedures are basically similar to those for new construction and, involve approval of detailed requests followed by sketch plans, specifications, and cost estimates. After necessary approvals for construction and financing are secured the work may be completed and evidence of expenditure submitted for reimbursement allowance.

There has been little extensive renovation of old schools to extend their life. Considerable age and wooden construction has militated against this approach. One exception is the old St. Patrick's School complex in Halifax which is intended for renovation with D.R.E.E. assistance at an estimated cost of half a million. In New Brunswick many high schools were considered inadequate for new secondary courses and so many new ones were undertaken in the 33 reorganized districts. It then became necessary to renovate existing high schools for junior high or elementary use. Costs for the approved improvements were paid by the government. A similar practice for supporting approved renovations occurs in Prince Edward Island. In Newfoundland there is statutory provision for allocating grants for maintenance and repairs up to 90 percent of the approved cost.

SUMMARY

Requests throughout the country urge that alterations should be more comprehensive and applicable to the whole building rather than to specified sections of it. Everywhere, requests contain many upgrading items that must be distinguished from renovations acknowledged for capital support. Universal policy requires that renovations, alterations, or improvements to extend the life expectancy of buildings must have prior approval of the work to be done and the cost to be supported. Rehabilitation or renovation in Canada has applied to old school buildings to be adapted for school use as has occurred across the border.[1] It may be significant, however, that many school buildings in this country might be so constructed or altered that, if they later become unneeded, they could be converted for commercial or other non-school uses.

The future use of relocatable buildings appears assured. Shifting populations and sudden accommodation needs still emphasize their value. Their use in suburban development as starter schools or additional rooms is significant where future development and enrolment is unpredictable. They can usually be transferred from where they are not needed to any center that needs more space or to which pupils from other attendance areas might be transported. Their use at any place in association with conveyance might defer costly construction until a system's total school population is identified in its various locations. Vacant portables or others not serving an essential need might thus be utilized accordingly. New ones might show more flexibility concerning washrooms, connecting corridors, or possible moveable walls for some that would be used in group complexes. The current emphasis on the flexible utilization of relocatables may prompt more attention to creativity in the designing.

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[1] (a) In New Jersey a large vacated barn was renovated to a Community College at about $450,000 or half the cost of a new building.

(b) Boston and Philadelphia secured old buildings such as warehouses and converted them to schools at much less than half the cost of a new structure.

(c) New York converted a former supermarket with a $600,000 renovation to a school for 500 pupils for whom a new structure might have cost about two millions.

-Reported in Life, October 22, 1971.

Chapter VI

FURNITURE AND EQUIPMENT

All provinces give some support for approved equipment. This assistance may be classified for vocational facilities and for furniture and equipment for non-vocational schools.

The introduction of the Federal provincial agreement of 1961 for vocational training in high schools provided that costs of approved furniture and equipment would be reimbursed up to maximum amounts. A few provinces still have some unused credits. Following the expenditure of the allowances and the withdrawal of further federal support the provinces continued assistance as a large share of the recognized costs. As facilities in schools were recognized for acknowledged programs equipment lists were then prepared for approval. For example, Alberta approved the quantity and maximum costs for equipment for different facilities and reimbursed school boards by 90% of their expenditure up to the approved maximum or actual amount, whichever was the lesser. Similarly, Ontario stipulated the items of furniture and equipment not regarded as part of the contract and specified the maximum amount of support to be given in respect of each facility.[1] Usually, the local district is expected to pay a share as in British Columbia where it is 20 percent of the approved costs. There has always been an expressed desire for some policy of replacement, particularly, of technical equipment. This has been up to two-thirds of the depreciated cost but the policy has declined in favor. Otherwise it becomes part of the operational budgets.

Expenses for furniture and equipment for non-vocational facilities are shared up to a maximum as part of the approved costs in all provinces except Alberta. For several years this province stipulated amounts for furniture and equipment in specified facilities such as science and language laboratories, home economics and industrial arts

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[1] Examples of Comparative Maximum Support per facility

	Beauty Culture	Typewriters Manual/Elec.		Business Machines	Auto Body	Machine Shop	Welding	Drafting	Bldg. Const.	Electricity Electronics
Alberta	14,500	7250 to 9501	12500 14850	to 19350	16,000	83,500	30,000	12500	17,000	33,000 (either) 66,000 (One of each)
Ontario		9500	17000	20,000	30,000	70,000	20,000	4,500	23,500	40,000
Manitoba	5,000 + furniture									

facilities, commercial rooms, and libraries. There was no approved list or verification of purchases. In the current regulations separate support for furniture or equipment in non-vocational schools is not specified.[1] However, there has been and still is provision that if tender prices of construction are below the unit support price the difference up to $1.00 per sq. ft. may be collected to be spent on equipment. If favorable tenders prevail at more than a dollar below the support price one-half of that difference may also be secured as a bonus for defraying costs of equipment and furniture.[2] Expected construction costs may require all the support allocation so that no such funds will be available for equipment. It is suggested that if support prices are revised that consideration be given for stipulating a maximum amount of support separately for approved furniture and equipment which may be provided according to evidence of the expenditures.

Such is the practice in Manitoba which grants eighty cents ($.80) a sq. ft. for furniture and equipment for new construction projects. For Industrial Arts in junior high schools there must be a minimum of 85 pupils to qualify for an equipment grant.

Ontario also supports approved items of furniture and equipment up to stipulated maximums. Some of this is by a stated amount such as $1200 for a classroom, $2200 for a science laboratory, and $5200 for instruments for a music room; a few allowances are supplemented by an amount per sq. ft. as, for example, a library may qualify for $1500 plus #.50 per sq. ft. Figures last year showed an average cost of approved equipment in 89 elementary schools as $72,095 for an average enrolment of 1000 pupils. In Quebec, lists of furniture and equipment with some specifications are approved for support. The Building and Equipment Branch sees that the standards it has set forth according to education needs and budget provisions are adhered to and standardizes equipment purchases throughout Quebec. The service is also responsible for approving outlays for equipment purchases so that they

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[1] Many request that equipment allowances should be restored. A Curriculum sub-committee for Home Economics asserts that equipment should be updated to include freezers, dishwashers, and intercom sets.

[2] Sec. 18, Alberta School Building Regulations.

may be eligible for grants.[1] The exploration of computer-assisted learning may result in provision of automated courses.[2] Visual aids have received support and the new Instructional Media Service explored the further needs for equipment as well as what agreements may be effectively concluded with various producers of materials and programs.

Libraries received special attention. The Act states that, every school board "is authorized to assume the cost of establishing, maintaining and developing school libraries".[3] The Department has an Education Libraries Service which has explored school library needs. In 1969-70 boards received $1,275,000 of library grants.

The Maritime provinces all support specified amounts for approved furniture and equipment. Nova Scotia provides $1500 such grants support for each new register classroom as well as for other high school classrooms. In addition it shares costs of library books for expenditures from $5,000 to $25,000 for enrolments ranging from 100 to 750 pupils. The maximum support granted for all such equipment and books shall not exceed $250,000 in a year.

There is support for furnishing and equipping facilities for home economics, industrial arts, business education, audio-visual services, and elementary physical education as approved by the Minister. The Minister may also approve an amount for replacement of equipment or furnishings approved as capital costs or for provision of new equipment required because of major curriculum changes. In New Brunswick, approved expenditures for furniture and equipment are part of the total cost of the project that is constructed by the government. In Prince Edward Island, also, costs of approved furniture and equipment are supported. Usually there are discussions with the school personnel

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[1] During 1969-70, it checked and approved transactions amount to $19,000,000. By way of interest, it may be mentioned that furnishing a medium-sized comprehensive school for 2,000 pupils represents approximately 15% of the total building cost; quoted from the Annual support, p. 19. The figure apparently, included the vocational equipment.

[2] The Laboratory for computer-assisted learning is still a research project at the Department level. Modular programming of courses is being studied to promote flexibility in relation to objectives and to facilitate computer operation in promoting significant individualization of teaching. This may all lead to preparation of automated courses. (Reported in the Annual Report of Quebec, 1969-70, pp. 104-105)

[3] The Education Department Act, 1964, Sec. 563.

about desires before the approvals are finalized. Some maximum support is specified such as $10,000 for books in a new library and a similar amount for the hardware in audio-visual aid equipment or $5,000 for gymnasium equipment.

The Newfoundland School Act specifies that regulations may provide for the allocations of moneys . . . for equipment and supplies for those (public) schools. Such assistance becomes part of the cash grant, not exceeding 90 per cent of the cost for constructing and equipping a school.

The market has provided many new features in furniture and effective equipment. Considerable furniture, much of it polyethylene, is of such sizes that it can be combined for multi-use. Carrels are sometimes comprised of tables with tops that can be lifted off. One supplier produces reinforced cardboard desks at $2.00 each. Others make fold-up bleachers and also folding tables that are recessed and can be brought forward readily for use in a lunch-space, study hall, or activity room. In one school a factory-mounted piano permitted its easy moveability for the Mobile Music Learning Center of the school.

The large amounts of specialized equipment purchased have posed questions about the effectiveness of tendering procedures. Specifications may not be uniform and individually tendered items to be eventually integrated in a system may not be compatible.

Cooperative purchasing through the coordinated efforts of many systems has been urged for effectiveness and economy, although it may be recognized that the production prices may not decrease significantly after a certain level of volume is reached. The systems-contracting may not be effective if many qualified regional suppliers tendered supplies for schools in different areas. The result might be qualifications of suppliers or agreement among them for taking turns at tendering. However, there are large amounts of small purchases and increasing attention is now directed at bulk purchasing. Some large school districts are buying large quantities of some goods for use in many schools. This has facilitated certain specifications such as texture of carpets and non-creeping features of the new nylon ones.

In some provinces, the government not only approves the list of equipment and suppliers, but also orders it through its purchasing

agency. For example, in Manitoba and Quebec the government sends a prepared requisition to the school boards for comments and endorsement and then sends it on to the purchasing agency. Furthermore, schools as in Quebec, may submit requests for equipment only from suppliers whose performance specifications have secured for them government approval to tender.

A review of practices indicates that most of the provinces approve the lists of furniture and equipment, accept a share of the costs, and sometimes require the submission of requisitions so that the approved items may be secured through the government purchasing agency.

CHAPTER VII

COST OF SCHOOL BUILDINGS

Figures concerning costs of constructions must be viewed with regard to the items included. All provinces include some contingency sum, architect's fees, adjusted sales tax, and the contract price in the established cost. However, the contract may also include varying items of equipment and site development. In addition to this, approved costs in some provinces include the cost of site and furniture. Moreover, costs are affected by the scope of the project and by the size and nature of an addition.

The data indicated in the succeeding pages is intended to depict the net cost of the building with any relevant information that may influence costs beyond the basic requirements.

BRITISH COLUMBIA

Many factors in British Columbia relative to location, size of project, and time of tendering influence establishment of approved costs.[1] Building has been chiefly for additions as in Vancouver where no new secondary school has been build since 1963. The Greater Victoria S.D. build four secondary and eight elementary schools during the sixties. Much of the $2,708,000 for new construction in the year following Sept., 1970 was for additions.[3] Some were to provide for expansion of the program such as for music or power shops.[4]

Economies are sometimes effected after the approved cost is established by using the board's construction men in a day labor scheme.[5]

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[1] Approved costs include the building tender, a $5,000 contingency sum and a 6% archietect's fee as well as an allowance for site purchase and up to 4% of the contract for specified items of site development. The amount for equipment is determined by the Department according to the program in the school.

[2] The Greater Victoria S. D. # 61 was established in 1946.

[3] Two additional junior secondary schools, Arbutus and Cedar Hill were opened in 1970.

[4] It appears significant that some shop classes constructed portable band rooms or pre-fabricated roofs.

[5] The Delta S.D. in Ladner just outside Vancouver imported many components for a Modular school according to S.E.F. specifications and built it with its own crew at a commendable unit price of slightly over $19.00.

Costs throughout the province in 1971 averaged about $18.50 and $21.50 per sq. ft. respectively in the elementary and senior schools. Per pupil costs were about $1200 in the elementary and about $2000 in the high schools. The following figures indicate some costs for buildings and additions exclusive of site work, fees, folding dividers, carpets, sound systems and other equipment.

	Tendered	Gross Over	Approved Cost	Unit Cost Per. Sq. Ft.
Roberts Addition	April, 1969			17.99
Strathcona Addition (Commercial)	Jan., 1971			20.90
McKenzie Addition	Nov., 1970 Feb., 1971			18.90
Dickens & Waverley Additions	March, 1971			18.45
Mt. Pleasant (Ladner) (Modular Elementary) (Day labor)	April, 1971			19.60
Arbustus Junior High (Victoria)	1970	67,803	1,272,992	18.75 +
Oliver School Ladner - day labor		86,332	1,750,000	20.00 - approved day labor

ALBERTA

Though there has been expressed concern about rising costs of material and labor the contract prices throughout the province in the early seventies were reasonably compatible with support amounts. Many boards set budget estimates for construction within support prices and requested architects to design within those limits. This insistence for specifications and cost estimates in conformity with the support price had significance. Occasionally when tenders were much higher than the support price discussions between the architects and the low bidder resutled in changing some specifications or altering the requirements in order to reduce the costs. It is generally maintained that the quality of construction has improved greatly in the sixties and continues to be of high quality for the basic features. Construction costs ranged from $13.45 to $16.19 per sq. ft. in the elementary schools and from $15.03 to $16.66 for secondary ones. The support cost per student ranged from $1000 to $1300 in elementary schools and from $1200 to $1550 in junior high schools without industrial arts and home economics. The addition of these facilities changed the range from $1550 to $2000.

The following data show the time of tendering, gross size, and tender prices for some new schools and additions in various locations of the province.

NEW SCHOOLS 1970

District	Name and Type of School	Gross Area	Date Tender Approved	Cost Per Sq. Ft. (Inc. fees less sales tax)
Edmonton R.C.S.	St. Jerome Elementary	19,864	February	$15.18
Ft. Saskatchewan (Strathcoma County)	Pineview Elementary & Junior High	31,360	March	17.22
Calgary R.C.S.	Bishop Carroll High (acad. and business education)	128,781	March	16.24
Calgary R.C.S.	St. Dominic Elém.	16,776	April	15.98
Salisbury (Strathcoma County)	Westboro Elementary	37,493	May	15.55
Strathmore	Elementary	24,920	May	14.40
Slave Lake (High Prairie Dis)	Elementary	20,217	June	16.25
Leduc	Willow Park Elementary	19,857	June	14.56
Calgary Public	Nickle Jr. High	60,611	July	15.03
Calgary Public	John G. Diefenbaker Sr. High (acad.- bus. education)	116,110	August	15.95
Springbank (Calgary Division)	Elementary	34,774	August	15.13
Calgary Public	Canyon Meadows Elem.	42,566	September	14.29
Grande Cache	Elementary	27,739	October	17.72
Slave Lake (High Prairie Dis)	High School	33,204	Novemer	16.66
O'Donnell (Sturgeon Division)	Sturgeon Heights Elem. & Jr. High	42,134	December	16.04

NEW SCHOOLS 1971

Calgary Public	West Dover Elementary	37,933	January	13.45
Calgary Public	Andrew Sibbald Elem.	37,933	January	13.97
Calgary Public	Alex Munro Elementary	37,933	January	14.04
Calgary Public	Penbrooke Meadows Elem.	34,729	January	14.09
Edmonton R.C.S.	St. Philip Elementary	22,425	February	14.48
Bonnyville 2665	Senior High	53,545	February	16.36
Calgary Public	Bob Edwards Jr. High	46,324	February	15.07
Calgary Public	Louis Riel Jr. High	46,324	February	15.13
Calgary Public	H.D. Cartwright Jr. High	46,324	February	14.78
Calgary R.C.S.	St. Boniface Elem.	19,717	March	15.99
Calgary R.C.S.	St. Henry Elementary	19,717	March	15.14
Calgary R.C.S.	St. Catherine Elem.	19,717	March	14.63
Salisbury (Strathcoma County)	Millshaven Elementary	37,242	March	15.66
Stony Plain	Junior High	36,705	March	12.57
Drayton Valley	Jr. - Sr. High	44,760	March	15.71
Edmonton Public	Evansdale Elem.	33,985	March	14.40
Edmonton Public	Duggan Elementary	39,485	April	15.02
Calgary Public	West Acadia Elem.	36,573	April	15.33
Calgary Public	Jerry Potts Elem.	30,480	April	15.64
Grand Centre (Bonnyville Div.)	Jr. - Sr. High	74,212	May	17.39
Edmonton Public	Thorncliff Elem.	35,875	May	15.17
Edmonton Public	McLeod Elem.	33,838	August	14.68
Edmonton R.C.S.	J.H. Picard Jr.-Sr. High	69,500	August	17.39
Salisbury (Strathcoma County)	Clover Bar Jr. High	52,540	September	16.43
Evansburg (Yellowhead Div.)	Senior High	55,880	October	16.28
Edmonton Public	Grace Martin Elem.	39,980	December	16.19
St. Albert P.S.6	Senior High	73,810	December	16.21

NEW SCHOOLS 1972

District	Name and Type of School	Gross Area	Date Tender Approved	Cost Per Sq. Ft. (Inc. fees less sales tax)
Calgary S.D. 19	Southeast Dover Elem.	30,288	January	$15.10
Cochrane S.D. 142 (Calgary Div. 41)	Elem. & Jr. High	27,368	March	17.41
Edmonton, R.C.S.	St. Augustine Elem.	20,969	March	15.19
Calgary S.D. 19	N. W. Bonavista Elem.	38,195	March	15.84
Calgary S.D. 19	N.W. Penbrooke Meadows Elem.	38,195	March	15.43
Calgary S.D. 19	S.E. Huntington Hills Elem.	38,195	March	15.48
Airdrie S.D. 918 (Calgary Div. 41)	Elementary School	19,661	March	18.55
Salisbury (Strathcoma City)	Glen Allen Elem.	36,964	April	17.17

ADDITIONS - April to September - 1971

District	Name and Type of School	Gross Area	Date Tender Approved	Cost Per Sq. Ft. (Inc. fees less sales tax)
New Sarepta	Elementary	4,029		18.79
Grande Prairie	Hillside Elem.	12,454		16.34
Sedgewick	High School	13,093		14.98
Blackfalds	Elem. & Jr. High	3,605		17.95
Crossfield	Elem. & Jr. High	5,684		16.71
Peace River	Springfield Elem.	4,182		18.65
Medicine Hat	Alexandra Jr. High	33,516		15.78
Red Deer	Oriole Park Elem.	5,669		16.54
Edmonton	St. Boniface Elem.	7,338		16.70
Edmonton	Father Leo Greel Elem.	15,492		14.66
Fort McMurray	Dr. Karl A. Clarl Elem.	10,000		19.96
McLennan	Providence Elem. & Jr. High	9,176		15.99
Taber	Central Elem.	18,587		14.80

ADDITIONS - 1972

District	Name and Type of School	Gross Area	Date Tender Approved	Cost Per Sq. Ft. (Inc. fees less sales tax)
Edmonton R.C.S.	St. Patrick Elem. and Jr. High	26,430	January	16.02
Edmonton S.D.	McKee Elementary	17,324	January	15.12
Redcliff S.D.	Parkside Elem and Jr. High	4,141	January	19.47
Edmonton R.C.S.	St. Catherine Elem. and Jr. High	16,610	January	16.65
Sylvan Lake S.D. (Red Deer Cty.)	Elem. Jr. Sr. High	4,001	January	20.62
Edmonton R.C.S.	Holy Cross Elem. & Jr. High	16,145	February	16.83
Calgary S.D.	Viscount Bennett Jr. Sr. High School	14,460	February	21.15
Red Deer S.D.	South Hill Elem.	13,340	March	15.12
Winfield S.D. (Wetaskiwin Cty)	Elem. Jr. Sr. High	6,395	March	21.16
Edmonton R.C.S.	St. Dominic Elem.	15,492	March	16.30
Taber R.C.S.	St. Patrick Elem.	6,835	April	18.76
Chestermere S.D. (Calgary Div.)	Junior-Senior High	24,650	April	18.38
Standard (Wheatland Cty)	Standard Elem. Jr. & Sr. High School	3,576	April	16.47
Strathmore County	Westmount Elem.	20,141	April	16.06

The above figures indicate tender prices for the approved areas and include fees and adjustments for sales tax[1] other expenses incurred pertain to costs of site or site development, equipment, or renovations beyond acknowledged support. Thus, though the support amount may cover the tender price fees, and some costs for equipment or site development there could still be additional costs.

Additions usually cost more depending on their nature and size. Small spaces including laboratories or washrooms would be more expensive than similar space for classrooms. The effect of size is reflected in the chart for additions.

SASKATCHEWAN

School enrolments have not risen recently so that school construction has been limited and may not exceed eight millions in 1972. New facilities in 1971 were chiefly for gymnasiums, home economics, and industrial arts. Even in Regina and Saskatoon construction has focussed on expansion of existing schools.

Costs did not increase significantly. Recent tender prices per sq. ft. for two school additions in the north were $15.11 and $15.80 respectively. Approval for construction of a gymnasium and science room in another addition in the north resulted in a tender of less than $13.00. Over forty conventional buildings showed an average cost of $15.69. Steel rather than concrete was used in many buildings with an apparent average unit cost of $15.58 for 11 of them. The total cost for about 57 projects was nearly nine millions with an average cost of $15.19 per sq. ft. for construction tenders and fees apart from revision for sales tax and other items of approved costs.

Estimates of expected increases in cost vary widely. More costs for labor appeared in the winter works program and the growing demand in negotiations for higher hourly rates is emphatic.

MANITOBA

About 85 percent of the annual expenditure of 25 millions in Manitoba has been for new construction.[2] For some time building costs

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[1] A few tenders in March and April for new construction are significantly higher than previously.

[2] The cost was for approved renovations in buildings when additions were built.

paralled the amount of support indicated in the approval of estimated costs. Such figures ranged from $17 to $22 per sq. ft. An analysis of costs of various component elements of construction included the following data:

Elements - Cost Per Sq. Ft.

Date	Gross Area	Architectual Items - inc. roof, walls, floors, hardware, and painting as well as paving and site development	Structural -Sub-Str. -Enc. Str.	Mechanical	Electrical	Total
May, 1969	13,300	9.97	5.71	4.30	1.69	21.67
March 1970	50,000	7.56	5.80	3.01	2.73	19.10
May 1970	39,600	8.51 +	3.35	2.53	1.69	17.10
Average of these and others		7.77	4.96	3.51	1.77	18.02
Adjusted to Jan, 1971		8.41	5.30	3.80	1.90	19.55
Larger Projects:						
April 1970	150,000	11.46 (Northern Area)	3.92	5.13	3.26	23.77
	167,000	7.55	5.92	4.44	2.57	20.48
Adjusted Average		9.03	4.91	3.61	2.17	19.82 +

Costs were adjusted in accordance with norm school standards. Some adjustments applied to isolation, special equipment, or particular requirements such as suspended ceilings or other items apart from norm standards. Detailed analysis and other experience was basic to approving a ceiling amount. Currently, specifications are adjusted so that costs may conform to the support price of $18.50 a sq. ft. except in special cases where a higher approved cost may be established.[1]

ONTARIO

Building costs for new elementary schools in Ontario range from about $16.00 to $22.90 per sq. ft. with an average cost of $19.50 per sq. ft.[2] Total gross costs including site development average about $23.35 per sq. ft. in the public schools and about $21.00 in the separate schools. Construction costs per pupil in the public and separate schools are about $1687 and $1520 respectively.

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[1] Cost for the Thompson School in the North was recently established at $19.31 a sq. ft.

[2] About 60% of total capital expenditure (about 200 millions) in 1971 went to new construction and about 40% of it was spent on additions.

Costs for secondary schools range from $19.00 to over $23.00 per sq. ft. Usually, there is an additional cost exceeding $3.00 per sq. ft. for more costs such as for site and its development. The average construction cost of secondary school buildings is computed at $22.19 per sq. ft. inclusive of fees. However, this might represent about 85 percent of the total expenses as costs for site work, furniture, and equipment frequently raise this to $26.00 per sq. ft.[1] The expenditure for services and mechanical work may account for a third of the gross cost and air conditioning may further increase the cost. Some of the schools have that although many are built for its later addition.

The following charts show some analysis of cost for a few typical elementary and secondary schools of various sizes in the past few years.

School	Date	Pupils	Space Per Pupil	Cost Per Pupil	Gross Area	Gross Contract Cost	Gross Unit Cost	Net Const. Cost	Net Unit Cost	Site Devel.	Architectual Struct.	Mech.	Elect.	Air Condition
George Vanier Elementary (Niagara Falls)	1968-1969	630		$1190	47940	$774,247	$16.10		$15.67 1.28 1 cu.ft.	21,768		3.09 (19%)	1.22 7.8%	
Valley Park Jr. H. S. (Toronto)		875			92106	2,085,500								
Pineway Elem. (Toronto)	1967-1968	680	70	1294	47696	985,000	19.22	$855,080	19.10	extra 50,000 (soil)	13.36	4.53	1.33	
Timberbank Jr. Public	1969-1970	580	78.03 Metro Formula	1542	45262			894,315	19.75		14.20	4.05	1.50	
J. B. Tyrrell Senior Public School	1970 1971	650	1 07	2177	69,352	1,415,000	20.40		19.59		13.55	4.39	2.46	
Projected		(800)	(96)	(1963)										
Valley Park Jr. High (3 storeys)		875			92106			2,085,000	22.63					
A. Y. Jackson Secondary		Large							19.59		16.02			1.92
Governor Simcoe Secondary (St. Catharine's)	1970-1971	930	117.2	2631	109,088	2,447,600	22.43							
Projected		(1600)	(102)											
Overlea Secondary (East York)	1971	1165			133,212 (25,399 A.U.F.)	3,809,850	28.60							
Westbrook Special Secondary		620			98,952+	2,319,000	22.52							

Costs have been rising.[1] Higher averages in 1972 for component elements in elementary schools are shown in successive periods as,

New Public Schools		Cost Per Sq. Ft.		
		Structure	Mech.	Electrical-Total
	Jan, Feb., 1972	11.35	2.08	4.22
	March	11.86	2.38	4.64
Additions -		15.18	2.37	4.37 - 21.92

The unit figure of $21.92 for additions includes sales tax and contingency sum but not fees. The figures for secondary schools have increased similarly. Costs differed markedly from those of 1969;[2] prices were reported to have increased 9.7 percent in the country and about 11.2 percent in the province in the next six months.[3] The new Capital Grant Plan of 1971 reflects regard for changing costs. Specifications for more features in Toronto impose additional costs in some of the metropolitan districts as do some of the buildings under the S.E.F. program.[4]

The difficulty of portraying meaningful construction costs throughout the province is intensified by the diversity of geographic locations and the efforts for economical design. The conditions of the market have been reflected in some low tenders such as one near the end of 1971 for $18.00 per sq. ft. inclusive of fees and furniture.

QUEBEC

A large portion of 152 million capital expenditure last year in Quebec was for high schools.[5] Market conditions and other factors influenced a rise in building costs over the previous period.[6] The normalized prices of 1968 showed a trend

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[1] The 1969 figures for 89 new elementary schools indicate $20.36 as unit cost for an average school of 68,840 sq. ft. for 1035 pupils which represents about $1256 construction cost per pupil.

[2] The 1969 figures for 12 new secondary schools indicate $20.95 as unit cost for an average high school 7172,100 sq. ft. for 1445 pupils.

[3] News Roundup, September, 1970.

[4] The School Educational Facilities group has developed an "open system" plan with an escalation clause concerning rising costs that may rise by the time of building need.

[5] In the fiscal year of 1969-70 over 40 comprehensive high schools were completed at a cost of about 190 millions to accommodate 87,000 students. Nine more projects were initiated at a committed cost of 33.5 millions for another 17,000 students. Specifications have been approved for new schools or additions in 26 centers as well and many projects were authorized as part of the "Operation 55" which authorizes regrouping of school districts to establish secondary school organization.

[6] The LaFleche and Calixa Lavalle high schools of over 325,000 sq. ft. each were contracted at $14.90 and $14.31 per sq. feet respectively. These are large schools for over 3000 students each.

that indicated $19.00 by 1972. In response to increased prices for materials and labor, costs rose as illustrated for the following high schools from January to July of 1971:

Tender Date	Name of School	Cost Per Sq. Ft. $
18-1-1971	LaSalle et Leroux	14.94
19-1-1971	Beaupre	15.94
23-3-1971	Laure Conan	17.01
25-3-1971	Forestville	18.70
30-3-1971	Jonquiere	16.24
4-5-1971	Greenfield Park	15.40
6-5-1971	Beauharnois	17.90
19-5-1971	Tracy	15.52
25-5-1971	Lac Megantic	15.68
25-5-1971	Saint-Prosper	15.40
8-6-1971	Notre-Dame-des-Laurentides	15.46
11-6-1971	Saint-Hyacinthe	15.14
17-6-1971	Granby	16.00
17-6-1971	Levis	15.59
23-6-1971	Saint-Joseph	15.71
23-6-1971	Montmagny	15.58
5-7-1971	Thetford-Mines	16.45
	Average Cost of Total	- 16.03

Cost were particularly high for Laure Conan (17.01), Beauharnois (17.90), and Forestville (18.70). A review of costs and accrued increases indicated for a few years is shown as:

Price Per Sq. Ft. $		Average $
1969 - 14.00 to 14.70	5%	14.80
1970 - 14.70 to 15.50	5.45%	14.80-by Aug.- 15.67
1971 - 15.50 to 16.40	5.8 %	16.03 by Dec.
1972 - 16.40 to 17.30	5.5 %	

The result was to raise the construction budget to 15.67, effective June, 1971. Rising prices since may raise the average to 16.70 and have already prompted revision of the normalized construction budget to $16.45 per sq. ft. with current consideration of a further increase to $17.00.

Periodically, costs are analyzed in respect of different elements of construction and prices for each are assessed with some projection of increases. Such an analyzed apportionment of budgetted construction costs over a few years is shown as:

	March 1968	Oct. 1968	March 1969	Dec. 1969	Feb. 1970	Aug. 1970	May 1971	Jan. 1972	March 1972	Jan. 1973
Foundations	1.34	1.38	1.41	1.49	1.52	1.57	1.62	1.63	1.73	1.78
Structure:	2.34	2.40	2.27	2.61	2.65	2.74	2.84	2.93	3.02	3.11
Exterior Walls	1.48	1.52	1.56	1.65	1.68	1.73	1.79	1.85	1.91	1.96
Interior Finish	3.09	3.17	3.25	3.44	3.51	3.61	3.75	3.86	3.98	4.10
Roofing	.48	.49	.51	.53	.54	.56	.58	.60	.62	.63
Electrical	1.64	1.68	1.73	1.83	1.86	1.91	1.99	2.05	2.11	2.18
Mechanical	3.08	3.17	3.24	3.43	3.50	3.60	3.73	3.85	3.97	4.09
General Conditions	.86	.88	.91	.96	.98	1.00	1.04	1.07	1.10	1.14
	14.31	14.69	15.08	15.94	16.24	16.72	17.34	17.89	18.44	18.99

Such figures are significant in establishing the total budget amount. In practice, it is intended that educational specifications must be such that costs should correspond to the support price. The only exceptions requiring approval apply in exceptional circumstances such as isolated areas. Obviously, the prices are related to the size of the project, but most buildings are for large enrolments. Figures still vary. Though some recent unit costs are not finalized the tenders show:

1 school between $14 and $15 per sq. ft.
2 schools between $15 and $16 per sq. ft.
2 schools between $16 and $17 per sq. ft.
4 schools between $17 upward per sq. t.

However, other expenses for fees, integrated equipment, case-work, and site development would be approved in addition for the total cost.

In any event, it is practice to review trends and developing conditions for establishing approval of cost figures.

NOVA SCOTIA

Much of the anticipated capital expenditure of 25 millions will be for additions. Although one large comprehensive school will need to be built, some growing areas such as Dartmouth, will need several new buildings.

Current cost of construction varies from $15 to 24.00 a sq. ft., throughout the province. Elementary schools range from about $15.00 to $21.00 but may rise to $22.00 or $23.00 inclusive of equipment in some centers as a reflection of different locations and unstable labor conditions. The median unit cost in 1968 was $16.85 and $17.06 in 1969. Costs rose rapidly in the next two years. In 1970 the median was $19.19. Some decline in the construction industry impeded the increase but higher costs prompted a revision of the basis for support to accommodate the rising costs that varied in different places. For example, the construction figure might be $17.00 per sq. ft. in Dartmouth, 18.00 in Cape Beeton Island or $21.00 in Wolfeville.[1] Costs near Halifax were generally lower as indicated below:

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[1] A school for Wolfeville for 500 pupils was recently approved as 36,814 sq. ft. for an approved cost of $774,000.

School	Time Of Tender	Gross Area	Unit Cost
Isle Madame District H.S. (Richmond City)	1968	84,487	16.40
Petit de Grat Elem. (Richmond City)	1968	26,686	16.85
Hawthorne Elementary (Dartmouth)	1970	44,310	16.70
St. Peters H.S. Addition (Richmond)	1970	26,686	19.00
Halifax County - Brookside J.H.S.	1971	54,600	15.80
- Tantallon J.H.S.	1971	50,700	15.00
-Lakeside J.H.S. (repeat plan of Tantallon)	1971	50,700	15.60

Costs are specially affected by need to import materials and also by bituminous shale conditions in the soil.[1]

NEW BRUNSWICK

Most of the annual expenditure of 18 to 20 millions has been for construction of new high schools and approved renovations of some existing ones for continued use or for elementary and junior high school facilities. Costs of some new elementary schools before 1971 ranged from $13.50 to $16.50 per sq. ft. apart from the allowances for furniture and equipment. Examples are:

	Tender	Pupils	Area	Gross Cost Per Sq. Ft.	Net Const. Cost
Woodstock	1967-1968	650	38,639	16.53	15.49
Forest Glen	1970		23,000	17.68	16.97

A few elementary schools such as Port Elgin have been recently constructed under a system approach[2] developed by the Department of Public Works.

Costs for high schools have been higher. Data for two schools show:

	Tender	Pupils	Area	Gross Cost Per Sq. Ft.	Net Const. Cost.
Tantramar Regional H.S.	1970	750	119,363	19.95	19.31
Dalhousie H.S.	1970	1,200	173,157	20.65	18.21

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[1] The shale swells when dry; slab-on grade cannot be used.

[2] Detailed information on systems approach and management is outlined in a later section.

However, costs have been rising. Recent costs for conventional construction now vary between $17.00 and $24.00 per sq. ft. depending on whether the project is for elementary or high school and also upon the amount of built-in equipment included in the contract.

PRINCE EDWARD ISLAND

For some years when the government of Prince Edward Island was paying specified grants as support of part of the expenditures, costs were about $20 a sq. ft. However, the figure steadily increased in the early seventies to about $23. For example, the last school of approximately 38,000 sq. ft. for 425 pupils was tendered for $860,000. This amounted to about $22.85 per sq. ft. for the construction cost. However, fees, site costs, and other items of support may increase this to about $950,000. Incorporating open areas has shown no significant difference in cost.

NEWFOUNDLAND

In Newfoundland building costs vary widely from $20.00 to $36.00 per sq. ft. Generally, schools under the DREE program are more costly than those build exclusively from provincial and local funds.

The above review indicates the degree of rising prices in some of the areas of the country.

CHAPTER VIII

COST CONTROLS

Throughout the country there is an accepted principle that government assistance for capital construction requires some financial controls. Various cost controls arise from recognition of needed accommodation for a specified enrolment, approvals of space, plans, and tendering and also the availability and allocated amount of capital funds. Frequently, portables are approved rather than more expensive construction. In some provinces there is local control through plebiscites and provincial approvals for borrowing. In a few, the government actually constructs the building, in others it controls costs by establishing an amount of approved costs for which it provides complete or shared support.

The following review of policies in each province indicates the extent of these practices.

BRITISH COLUMBIA

British Columbia's controls are manifest in the requirements[1] for many approvals for spaces, plans, cost estimates and all tendering procedures as well as the limit of support grants and permissions in regard to tax requisitions.

Currently, boards have no authority to build more than the area approved. The sharing of costs is limited to the total approved space and boards may not finance costs of unapproved area for larger facilities.

The School Planning Branch maintains a construction-cost control and approves all building plans. This approval and that of cost estimates[2] must precede the approval for tendering. A tender may not be approved or the government may share only to an approved cost and the rest will be regarded as non-shareable. However, a board's capital levy can be for one year only and a favorable referendum does not ensure that approval will be given for the expenditure.

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[1] The mandatory specifications of the School Building Manual imply a comprehensive control that may be more applicable to custom design or fairly standardized traditional schools. Though more selective control might still be added, new building concepts relative to flexibility, standardization of components, open areas, and systems approach may prompt modifications that would reduce the rigidity of some of the current regulations. Adaptability and plans for future expansion may also contribute to a lessening of some of the requirements.

[2] Early cost estimates may need to be increased for approval by tendering time. A very high tender may mean that some specifications will be reduced or deleted.

The amount of non-shareable costs a district may assume is subject to the approval of the Financing Authority. The amount of support is controlled in relation to the area assessments. Costs for site development including playing fields and services in the contract are limited to 4 per cent of the approved building cost. Support for furniture and equipment is limited by approval of items and costs.

The amount of debenture funds allocated each year constitutes another feature of control.

ALBERTA

Costs in Alberta are not controlled by approval of estimated costs. If boards have initially indicated a maximum construction figure to the architect, they sometimes require him to redesign the project if the tender significantly exceeds his final estimate. Local control may also be exercised through a plebiscite for borrowing; a further approval is needed from the Local Authorities Board. This Board considers the request and financial status of the district, the support for the estimated costs, and the amount to be raised locally before it grants authority to borrow. Actually, however, the significant control of costs is largely determined by the school board's decision about total expected cost having regard to the maximum amount of government support[1] to be given for the approved area.

The indirect form of control has not prevented districts from incurring expenditures in excess of support prices or for unapproved areas. An element of control has been lacking by providing unsupported debentures for the excess costs for the recognized areas.[2] In fact, provision of debentures for it may have facilitated the practice of incurring the extra expenses. The repeated requests for more specialized facilities and their enhancement emphasizes there has been little control of costs for unapproved area. The Buildings Board specifies the

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[1] Support amounts were last established following a review of tenders and a research study that analysed costs of building components, emphasized the significance of design, and concluded that construction costs might be reduced.

[2] Debentures were once issued for the amount of a bylaw so that unsupported debentures were readily available for extra costs. Policy has been more carefully observed in the past several years in issuing debentures only in respect of the approved area.

amount of support for the facilities it approves and the Branch may examine plans and determine the amount of area not approved. Information about excess costs and unapproved area is referred to Field Administrative Officers for discussion with school boards. Need has existed for restricting the proposed capital plans of some boards, particularly, when they desire loans.

The Regulations provide that the Buildings Board may require replanning of projects but this has been observed chiefly concerning the proportion of instructional space[1] and there has been extended freedom to the largest system to avoid approval of final plans.[2] It has not been required that plans must be redesigned to eliminate unapproved space which imposes a local cost. An element of indirect control operating here is that it is intended that debenture funds will not be available for the extra area.

Another financial control arises from the limitations on increases in tax requisitions. Again, the use of leased space for temporary conditions may restrain costs for new construction. Obviously, the extent of time involved and the amount of rent would be basic considerations. The school board may also consider the relative values of constructing space to conveying pupils to existing facilities or securing portables from some area where they are not in use.

SASKATCHEWAN

Cost control in Saskatchewan lies chiefly in approving the costs for approved facilities. Excess areas must be paid for from current revenue. The requirements that the district sell half of its debentures and that it must levy in the first year for a tenth of the cost may provide some incentives for economy. Furthermore, the limitations on tax levies for capital purposes and for borrowing provide a restraining influence. Permission to tender will be given only after the board has sold its debentures and made other necessary financing arrangements.

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[1] School Building Regulations, 173/70;
22.(2) The Board may rule on the plans of new projects, or require their replanning, and in such cases may make such adjustments to the recognition of need or withold or remove recognition of need as it deems necessary to carry out its requirements.

[2] Section 95(2) of the School Act specifies that systems having over 15,000 students need not have final approval of their building plans. They receive recognition of a certain amount of instructional area and of non-instructional area and they may design each amount according to local desire.

MANITOBA

Cost controls are evident in the sequential approval for initial proposals, sketch plans, working drawings and specifications as well as for cost estimates. The acknowledgement of instructional and gross area does not permit acceptance of unapproved or excess space. Specifications, when working drawings are submitted or tenders provided may be revised so that contract prices may conform to the approved cost. Similarly, costs of furnishings and equipment are also controlled.

Policy has imposed priorities so that only increasing enrolments may justify new construction. There is a growing concern to continue the use of old buildings or repair those that are structurally sound. This control implies restraining costs for buildings merely to provide more sophisticated facilities.

ONTARIO

Cost controls in Ontario are manifest in the grant amounts approved for the Accommodation Units recognized. However, the maximum recognition is limited to 16,000 such Units. The controlled ceiling amount of support varies according to grade levels and location and is subject to a further control of the maximum amount of support in relation to the assessment of the area involved.

Allocating the amount of debenture funds available to a district imposes another form of control. Borrowing must be approved by the Ontario Municipal Board. Furthermore, the limitations on operating budgets in respect of current capital costs also restrain boards from incurring large expenditures for excess costs or unapproved areas.

QUEBEC

Cost control in Quebec lies chiefly in the approval of costs to be supported and the restrictions on any other spending. The Directorate of Buildings and Equipment includes a service group that pursues research study on space utilization, materials, and construction methods. This is helpful for preparing directives and enunciating minimum standard specifications. These last are increasingly computerized to provide for ready availability and adaptation to special conditions. The service is extended to preparing detailed building budgets and a technical program for the approved educational specifications of each school. The budgets are revised periodically as indicated before.[1]

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[1] Details given under costs in the last chapter.

Directives about working drawings imply quality control and elimination of non-essential features. Reportedly, the emphasis on design and space utilization has reduced the areas recognized by over 10 per cent within the first 18 months after such controls were imposed. Recent rising costs may reflect some lessening in observance of controls.

The Directorate controls the expenditure of all capital funds. Department engineers supervise projects and ascertain that consultants retained by boards perform the intended inspection work and quality control service. The Buildings and Equipment Branch provides a statement of the net cost of the project and the Finance Branch supervises the expenditure of funds.[1] Excess costs are a local responsibility if financing is approved. However, controls restrain this practice. Whenever a project exceeds the budgetary allowance as indicated in estimates or tender, revisions of the plan are requested to reduce the cost to an acceptable level. If an emergency arises, such as an abnormal soil problem, there should be an immediate request for approval of a revised estimate, particularly, if the contingency sum is insufficient. Regulations do not permit an extra tax levy or use of funds from the current operating budget which has already been approved.

THE EASTERN PROVINCES

Costs in Nova Scotia are influenced by government controls for the amount of shareable costs that will be supported for specified grantable space. The amount of the grant is further controlled by determining the percentage of costs to be given as support according to the assessment in different areas. Municipal authorities must approve of the proposed expenditures and the Department of Municipal Affairs must approve the borrowing by debentures and it also controls their sale and time of issue. The fact that some debentures must be sold on the open market may be an indirect restraint.

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[1] About 70% of the board's expenditures is covered by grants as the work progress is reported with appropriate invoices, and the balance is financed by long-term loans. For schools built by local boards about 80% is paid over a maximum of 7 years, and is applied to debenture redemption. The annual cost of servicing long-term loans for approved capital expenditure is eligible for a budget balancing grant. Long-term loans contracted by school boards in 1969-70 amounted to 100.8 millions.

In New Brunswick and Prince Edward Island the governments exercise full control as they approve the plans and specifications, control the tendering, and pay the total construction costs that they have approved. In New Brunswick there may be some taxpayer control through provisions for a plebiscite if a district board introduces a proposal for supplementary capital expense beyond that approved for provincial expenditure.

Newfoundland's control lies in its approval of building proposals and the amount of support it may give up to 90 per cent of the cost.

In all of these provinces the use of Federal (DREE) funds imposes some controls as well.

CHAPTER IX

OBSERVATIONS CONCERNING COSTS AND CONTROLS

Costs are affected by various factors throughout the country. Observation in regard to them pertain to:

A. Expectations for Rising Costs

B. Factors Influencing Cost Increase

C. Concern for Physical Effects of Costs Restrictions

D. Financial Implication of Cost Controls.

A - EXPECTATIONS FOR RISING COSTS

Prices have risen in many areas. This situation has been, particularly, noticeable in the Eastern provinces where cost approvals were revised. Ceiling supports in the prairie provinces probably restrained some increases. However, developing conditions indicate that costs will rise significantly. Some very recent tenders for new construction in Alberta are higher than in the first two months of the year. An elementary school near Calgary was tendered for $18.55 and two in Edmonton were tendered above $17.00 per sq. ft. Specifications were an unlikely factor for the increase; one of the projects was identical to one tendered a year before at $13.99 per sq. ft.

School authorities point to expectations of rising costs as indicated in current market conditions and the data of construction indexes.

Indexes of construction costs have indicated increases for labor and materials in varying amounts in different provinces. They were reported to have increased nationally about 9 percent in the first six months of 1970 though the figure for Ontario in that period was 14.7 percent.[1] Capital expenditure is projected by Statistics Canada to average an annual increase of about 4 percent for construction and about 6 percent for materials during the seventies in terms of Constant 1969 Dollars. However, figures for Quebec show wage increases of 17.2 percent from February 1970 to February, 1971, whereas cost of materials rose about 1.7 percent. Other indexes for some areas showed increases up to 19 percent and 15 percent in school construction in the

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[1] News Roundup, 1970.

early seventies. Costs of buildings for the Public Works Department in Alberta increased significantly though possibly rooms were smaller and there was more need of duplication of services. Figures for provincial buildings and hospitals support this view. In Ontario the unit cost for public buildings[1] has exceeded costs for schools. Costs for apartment houses are, reportedly, not as high. In British Columbia a quoted cost index in 1961 was 101.2 whereas it was quoted as 173.6 in March, 1971. The conclusion is that earlier tender prices would be much higher if adjusted to 1971 levels.[2] For example, a unit tender cost of $13.58 in 1962 with an index of 99 might be price adjusted according to an index of 1973 to a unit cost of $23.60 in 1971.

After appropriate weighting was attached to the different indexes a composite index of non-residential construction cost increase was set at 9.9 percent.

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[1] Cost for other buildings have increased about from 6 to 8 percent in the past year; e.g. the range in costs per sq. ft. in 1970-71 was: Hospitals $38 - $42; banks - $25 - $33; and small commercial buildings $22 - $27. Only light industrial buildings showed a range from $9 -$12 and residential homes from $14 to $20.

[2] Comparative Sq. Ft. Costs for some British Columbia schools as issued on May 7, 1971.

Project	Number of Floors	Const. Note (2)	Date of Tender	As date of Tenders		Adjusted cost per sq. ft. based on March / 71 cost *
				Cost Index *	Cost Per sq. ft.	
Mount Pleasant	1 & 2	B	April/71	173.6		19.60
Strathcona Addition	2 - 4	A	Jan./71	173.0		
(a) As tenders:						
School section					22.55	21.60
Total bulding					21.85	21.90
(b) As revised -						
School section					20.90	20.95
Total building					20.55	20.60
Note (1)						
Roberts Addition	3	A	April/69	155.8	17.87	19.90
Weir-original bldg.	2	A	Jan./61	102.2	12.33	21.00
Jamieson - orig. bldg.	1 & 2	A	Aug./60	101.7	12.58	21.50
Nelson Addition	3	A	Jan/64	114.7	15.50	23.45
Kitchener Addition	3	A	Feb./62	99.9	13.58	23.60
Dicken & Waverly Annexas	1	C	March/71	173.0	18.45	18.50
Mackenzie Annex Addition	1	B	Nov./70		18	
			Feb./71	173.0	18.90	18.95

*Southam's Construction Index - B. C. Series - This index stood at 173.6 in March, 1971.

Note (1) Does not include folding partitions - Other features revised to reduce cost.
(2) Types of Construction - A - Fire Resistive
B - Protected non-combustible.
C - Unprotected combustible.

Note: Cost figures do not include site work, covered play areas, architects' fees and equipment. These costs do include carpets, folding partitions and sound systems where applicable and except as noted.

It has been anticipated that the upward movement of the price index would be reflected as inflationary results in the labor market, though other developing conditions may have operated to discredit the full extent of the predictions. Certainly, prices in some provinces, such as Alberta, did not increase as expected. However, during the past year, many provinces acknowledged higher prices by establishing larger amounts for approved costs. Expectations are that the conditions which prompted these revisions will appear more significantly in other areas of the country.

B - FACTORS INFLUENCING COST INCREASE

Many factors have been operating in cost increases. The rising labor costs is usally cited as the most significant one. Favorable prices at the beginning of 1971 tended to rise as summer construction increased towards a peak year and called heavily upon the labor supply. During the same period costs of lumber, hardware, paint, and other materials also increased. Tenders invariably depend on time conditions and the availability of work. The seasonal changes in costs prompted expectations of permanent increases. In some areas changes for basic construction were transitory and as conditions stabilized, tenders resumed a level indicating limited change. Possibly, reduced interest rates, a decline in construction and a depressed attitute concerning restricted credit were reflected in the tenders.

However, the advent of freer credit for more general construction affected the bidding climate. Consumer confidence accompanied a lessening of restraints for borrowing funds. Expectations of a 10 percent increase in construction anticipated more expenditure for labor. From an incipient trend for higher prices a year ago it may have been concluded that some merely reflected uncertainty about conclusion of labor contracts. The attitude of contractors and architects indicated this concern. In Saskatchewan a group of over twenty architectural firms estimated a 1972 cost increase of from 10 to 25 percent dependent on various conditions, the chief of which pertained to labor.

Construction Associations in various provinces have periodically noted the effect of wage negotiations of different tradesmen associated with the industry. Demands in negotiations in Saskatchewan show requests

for 20 to 22 percent increase in hourly rates. This would imply a 10 to 12 percent rise in construction under the current proportions of about 55 per cent for labor. Many regional contracts for certain sub-trades were effective until March and expected increases from negotiations, have been realized in recent agreements, some of which showed 10 to 20 percent increases.

The overall cost increases in Alberta resulting from labor agreement were expected eight months ago to approximate about 7 percent. Negotiations for higher hourly wage rates have finalized increases in wage agreements over specified times. Rates vary slightly for some different locals. Special allowances pertaining to vacation pay, mileage, and other items raise the actual wage amounts. The following chart shows the hourly wages in succeeding periods thus indicating the increases that have been negotiated.

Hourly Rate of Pay

	Prior to April 1971	May 1971	July 1971	Oct. 1971	April 1972	Oct. 1972	Dec. 1972	Jan. 1973	Total with other Allowances Dec. 1972
Bricklayers	$4.55	$4.75	$5.05	$5.25	$5.55	$5.80	$6.10	$	$6.91
Carpenters	4.70	5.00		5.15	5.50	5.65		5.85	6.58
Masons		4.20	4.60	4.80	5.10	5.30		5.50	6.20
Electricians	5.55	6.00			6.35	6.65			7.46
Insulators		4.20		5.00	5.30	5.60		5.90	6.67
Laborers		3.60	4.10	4.15	4.50	4.60		4.75	5.32
Plasters	4.85	5.25		5.65	5.75				6.42
Plumbers		5.45	6.00		6.30	6.55			7.70
Sheet Metal	5.15	5.45		5.75					6.48
Structural Ironworkers	5.10	5.40	5.75		6.10				6.97
Lathers	4.90	5.30		5.70	5.80				6.27
Painters	4.05	4.50		5.00					5.48+
Tile and Terrazzo		4.50	4.90	5.10	5.35	5.60		5.90	6.60

Negotiations in Quebec for hourly rates for labor indicate a steadily increasing cost as indicated below:

	Plumbers & Electricians	Masons	Carpenters & Roofers	Painters	Day Labors	Average
March, 1969	$3.55	$3.55	$3.35	$3.25	$2.95	$3.36
Dec., 1969	3.85	4.00	3.79	3.68	3.37	3.76
Feb., 1970	4.15	4.09	3.89	3.79	3.49	3.92
Aug., 1970	4.45	4.39	4.10	4.39	3.79	4.23
March, 1971	4.65	4.59	4.39	4.59	3.99	4.46
Jan., 1972	4.90	4.84	4.64	4.84	4.13	4.69
March, 1972	5.15	5.09	4.89	5.09	4.38	4.94
(For) Jan., 1973	5.40	5.34	5.14	5.34	4.38	5.16

The effects of labor organization in the Maritimes is eqully significant. Demands in Ontario have shown similar trends. In British Columbia negotiations are carried out with the Construction Labor Relations Association bargaining for

over 800 contractors who are associated with the Yukon Building and Construction Trades Council. Attempts to restrain provincial increases have been resisted. Plumbers and electricians recently rejected an offer of a 6.5 percent increase plus fringe benefits for each year of a two-year contract and proposed to extend a strike to more contracting firms.

Actual and impending strikes have bolstered the negotiating demands of tradesmen in different provinces. Occasionally, serious criticism is expressed.[1] Concern about the effect of union wage demands on inflation may promote some imposition of compulsory arbitration or wage and price controls.

It is acknowledged that labor prices are rising although the total project cost may not increase proportionately. Altered design or building procedures may promote economy. More technical equipment often reduces the number of laborers needed or the time required for a crew to complete the task. More prefabricated material and new mechanical fittings may reduce the time for installation or enable suppliers to install equipment without large increases for labor.

Other factors are noteworthy. Obviously, costs are affected by the design of a project as well as its size. Attractive exteriors, broken roof lines, and customized doors and windows may be alluring but more expensive in construction.

Locations influence costs in respect of conveyance of materials and availability of skilled labor. Subsistence allowances are requested for some laborers and tradesmen sometime want special concessions such as travelling allowance or work schedules that require payment for overtime.

Abnormal conditions may require special features such as structural floors rather than slab on grade and possibly increase the foundation component of construction up to $1.00 a sq. ft. Very abnormal soil conditions may require pilings or bituminous shale may require structural floors or provisions for maintaining the water content of the subsoil.

Costs may be raised by observance of increased requirements from health authorities or fire commissioners. Costs are frequently increased to meet local building codes. Some of these may exceed those of the National Building Code.[2] However, there is favor for more uniform minimum standards and building

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[1] The Prices and Income Commission noted a year ago the threatening precedent set when sheet metal workers in London, Ontario, got a 40% raise over two years.

[2] The New National Building Code, July 29, (Fifth Edition)

research on a national level in respect of structural design, mechanical features, and construction services.[1] New grading rules in lumber standards have reduced sizes slightly and required new span tables in the code requirements[2] and will affect material, prices somewhat.

Requirements for fire-proofing steel beams may raise their cost beyond that of pre-stressed concrete even when the latter may need more transportation.

It is getting harder to get firm commitments on material so that tenders can be submitted realistically. Material prices are advancing on short notice.

In some provinces high humidity requires that buildings must have a brick veneer or enclosed air space to provide protection and insulation whereas in some other areas masonry blocks may serve as the exterior and interior wall surfaces. The cost of proper painting and maintenance is a significant item in cost.

Needed importation of materials, transportation costs, and availability of heavy supplies such as steel or concrete are modifying factors. A limited labor supply and the degree of its productivity are also significant. In some areas the supply is related to seasonal occupations and much construction is in the winter.

Prices vary also because of different specifications for open area, air conditioning, modular components and special floor finishes. Open area requires longer spans, special ventilation and usually it has moveable partitions or dividers and much acoustical treatment. Again, costs are affected by local desires to add extra area or to provide extensive built-in features or to embellish the finishings of the approved space.

C - CONCERN FOR PHYSICAL EFFECTS OF COST RESTRICTIONS

Two significant features present themselves concerning construction, particularly, in Alberta. One is that costs are definitely rising with

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[1] (a)The Federal Department of Trade and Industry has carried forward considerable study in its BEAM (Building, Equipment, and Materials) program.

(b)An Alberta Committee was established in January, 1972, through action of the Department of Municipal Affairs to report on feasibility and adoption of a uniform building code, based in the National Building Code, for mandatory use by all municipalities.

[2] Graded in accordance with 1971 rules of the National Lumber Grades authority (NLGA) of Vancouver.
Span tables are also specified by the National Research Council of Canada as part of the National Bldg. Code in Publication NRCC 11862, 1971.

inadequate counter-balancing effects. The other is the regional disparity in resources that is promoting serious tax burdens for costs beyond the government financial support.

In many parts of the country some specifications have been reduced or eliminated in establishing approved costs for shareable support or for contract prices comparable to a specified ceiling support if a tender indicates excess costs. An alarming statement is that in response to rising costs, the limitations on specifications have been exhausted and a downgrading of quality is allegedly threatened. It is asserted that specifications regarded as standard until recently are now being omitted. The situation is more serious in small buildings or additions.

Cut-backs may be in mechanical services, air control or conditioning, finishing materials, cavity construction provided by brick veneer, or in other items that increase operating expenses. Arguments exist that construction prices have been restrained at the expense of maintenance and that subsequent renovations are classed as upgrading. It is further claimed in some cities that a declining quality of construction may reduce the life expectancy of the buildings.

If such conditions are developing as a result of serious reduction of the basic specifications or standards then tender prices may be poor guides in considering costs for financial assistance. It is suggested that, periodically, there should be professional evaluation of the quality of the fundamental building elements to be sure the approved cost or support amount is sufficient for quality construction for the share intended to be assumed by the government.

D - FINANCIAL IMPLICATIONS OF COST CONTROLS

The question is paramount as to what share of capital costs should be assumed locally or to what degree provincial public funds should underwrite the costs.

In at least seven provinces support is not intended as more than 90 percent of the approved cost and many centers receive far less according to larger assessments. Only in Prince Edward Island and New Brunswick where all property taxes are remitted to the province, do the governments, assume total costs and construct the schools. For the most part, local school authorities pay some of the costs in all other provinces although

this may be very limited in Quebec. Expenses for school district support are subject to many controls in all provinces except Alberta where boards may legally build unapproved area and may incur additional costs for local desires in the specifications or because of unfavorable locations or market conditions at the time of tendering.

Practices in most provinces of approving costs in respect of different schools may have widespread effects on general price increases. Local presentations may prompt approvals of particular projects with estimated costs out of proportion with another[1] and with heavy excess costs. The criterion of educational equality is usually accepted as a principle. Opinion is general that basic facilities in areas of limited resources should be as good as those in more wealthy areas. This direction toward equalization has contributed to the idea of supporting a share of costs in relation to local assessments in some type of Updegraff formula.[2] The consequence is that some areas get no capital support, as in Halifax,[3] or small proportions as in other centers such as Toronto, Montreal, or Vancouver, whereas some areas, subject to isolation or low assessment, may be supported up to 80 or 90 percent of the approved cost.

The establishment of approved costs has been an important feature of control and expression of opinion in most provinces favored the method as it permitted flexibility concerning different projects according to size or other conditions. From a social or equalitarian view much of this policy is commendable, particularly, in provinces where all local taxes are expended in the district rather than part or all of them being remitted to a central fund.

A toal cost approval has allowed flexibility in many areas and it would permit specific support in other provinces, such as Alberta, for equipment and site development; it might also permit differing financial recognition for another dimension of educational opportunity

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[1] An area might secure an approved cost of 9 millions for 1200 pupils with a support of 3½ millions whereas, the approved cost for another of similar enrolment might be 7½ millions with less support. Such approvals involving large excess costs would apply in areas of high assessment desiring very special features. The practice permits consideration of the conditions respecting each project in approving a total cost and thus the amount that may be paid locally.

[2] The Updegraff formula is a variable-percentage plan for fiscal equalization that depends on provincial and local sharing of costs according to the local economic potentiality. The lower the local ability to finance the higher the percentage of provincial support. Of course, it may still mean that the local share is harder to pay in one area than in another.

[3] In Nova Scotia, annual payments for capital costs are apart from the operating budget except for the new amalgamated school districts.

involving special facilities for opportunity classes, handicapped individuals, or occupational study groups.

The idea has evolved in Alberta that the payment of a major part of local taxes into a provincial fund warrants a large amount of capital support. It has also been maintained, however, that such support should provide for basic facilities of an equitable nature but that districts who wished to exceed such standards should be free to expand the specifications and assume the additional costs.

Many districts, under various influences, have digressed considerably in this regard and the cumulative effect of their excess costs has increased supplementary requisitions in great variation in different regions. The result is an incessant drumbeat of demand for increased financial support. But, as in other provinces, the irrefutable condition exists that districts should not be free to incur large additional expenditures for provincial support without prior approval. It is also significant that without adequate resources, discretion, or controls some districts may incur additional expenses that would readily surpass their ability to pay and the government might, eventually, be called upon to assume some of the financial obligations.

Support of all costs in Alberta has been on a shared basis as boards frequently assumed costs for site development, equipment, and possible building expenses that exceed the support price. Excess building expenses have occurred partly because of local desires for unapproved areas - large libraries or gymnasiums and non-instructional space - and extensive furnishings in classrooms or ancillary areas, or other special construction features as well as items of sophisticated equipment, particularly, in some subject areas and in mechanical and electrical services. The design as well as the specifications is usually significant. Periodic demands for more and larger facilities and their equipment emphasizes the need of controls beyond standard or equitable specifications. Extra expenses have arisen in part also because of varying costs in different areas on account of geographic factors, size of the project or availability of material or labor at tendering time.

Payment for unapproved area should not be a continuing problem as costs for this were a charge to the current revenue and did not involve commitment of funds from future budgets. Current restrictions on local requisitions should restrain desires for excess area. The amount of it

has decreased considerably. Figures for 1968 indicate a total of 68,093 sq. ft.[1] at an estimated cost of $1,200,000; the data for schools financed in 1971 shows about 21,824 sq. ft. of excess area.

However, commitments can be made for annual payments on unsupported debentures for excess costs for the approved area. The assumption of such costs has in the past been absorbed in the budget and is reflected in a higher tax requisition of some districts other than those who received special operational grants. Excess costs are not a new development to be attributed to 1971 conditions. Debenture issues for excess costs on approved area in the 1968 contracts was $10,896,718. apart from the supported debentures amounting to $42,648,282.

Though many districts have regarded the ceiling support in restraining net construction prices,excess costs still appear, particularly, in the cities. Unsupported debentures amount to $8,891,954 in 1970 out of a total issue of $42,686,070.[2] The amount decreased in 1971 to about $2,289,115.out of a total of $30,759,832.

No control has been involved in the approval of necessary extra costs. Limitation of debenture issues to support amounts only,might have restrained excess costs but would have imposed a still greater burden in some areas when there was no geographic differential of support. Some of the excess costs might even have been avoided if

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[1] Floor areas for construction in the province (1968) were:

	Gross Area Sq. Ft.	Unapproved Area Sq. Ft.	Percent of Excess Area
North ½ of the province	1,333,666	17.852	1.35
South part	1,316,938	50,241	3.9
Cities:			
Edmonton R.C.S.	356,738	3,039	1.
Edmonton Public	352,650	8,980	2.5
Calgary R.C.S.	50,779	421	.8
Calgary Pbulic	608,377	30,135	5.0

[2] In 1970 debentures for excess costs in the Calgary and Edmonton public school systems were 4,309.393 and for the separate school systems 334,202; for the remaining cities excess costs amounted to $740,824; districts in the rest of the province received 4,507,535 of unsupported debentures for excess costs. Some of the construction had been commenced in 1969 and the issue of debentures was actually completed in 1970.

In 1971 there was less construction and more restraint of excess costs, especially, in the rural jurisdictions which received $517,684 debenture for them, whereas the cities received $1,771,431, of which $1,293,000 debentures were issued to the public school systems of Calgary and Edmonton for excess costs alont with the support amount of $9,625,000.

there had been some type of approval of required expenses only. There has been a growing need of controls of capital programs in some type of approval that eliminates costs that appear unnecessary. Henceforth, additional costs included in the budget may be hard to meet within the limits of current regulations for local levies. In a province where there is no requirement for government approval of a school budget this regulation may need some modification in respect of necessary capital costs if there is no special grant or balancing allowance.

In any event, necessary extra costs have been significant. The situation is aggravated by differences in geographic locations and property assessments where varying supplementary levies are imposed for the additional expenses. There are examples of one year's building program requiring from three to six mills extra levy.

Most other provinces acknowledge some form of differentiated support in relation to approved costs and local assessments. Two governments have arranged the actual construction. In the rest,ceiling amounts are used as guidelines in finalizing the estimated or tender prices to be supported. Alberta does not yet approve the total cost, or control any of the features contributing to them. Its policy exists alone in stipulating the same amount of capital support applicable to all areas regardless of their economic resources. In a province of diverse potentialities the weakness of this apparent inequity in practice is fully exposed on many occasions.

Many areas may include tender alternatives that require all the support price but other areas must be most cautious about specifications. Geographic location may influence requirements for special features in areas that insist they have no financial resources to undertake extra costs. The consequent variation in standards should, hopefully, not reduce the quality of the basic components. This may need further investigation in relation to the costs involved.

Throughout the country there has been periodic consideration of costs that may be acknowledged for shared support. This important procedure might be extended in Alberta with consultative services involving architects, engineers, and possibly the construction industry to ensure that pertinent costs permit quality construction of the

significant features. Figures have been revised in many areas.[2] Recent considerations in Alberta about recommending more support are influenced by a majority of tender prices approximating estimated building costs for the projects as specified. Some of these have been from distant areas without convenient availability of materials or tradesmen. It is important to know that quality has not deteriorated though the suggested threat of jeopardized standards has come from the very large centers.

Though remittance of some property taxes to the Foundation Program has prompted claims for more capital support, it is significant that this contribution is only part of the total tax requisition on property and that some proportion of the supplementary amount may be regarded as a local share of building costs.

Such policy appears defensible if the government does not wish to assume total cost of school construction although there have been many examples of full support for approved facilities. It has been argued that some assumption of local costs should encourage efforts for restraints in building costs.

The province already supports a very large proportion of the capital costs. If it were to build the facilities or assume the full cost of them, construction would, presumably, be controlled according to government specifications with very limited, if any provision, for local support of extra features or costs.

Currently, there is a growing need of curtailing supplementary requisition amounts needed for capital costs in addition to the provincial one or else need of dependence on some form of revenue other than from property. Any new financing system that proposes removal of some sectors of property tax or different distribution of provincial grants challenges concern for the diversity in the resources of various areas. Studied regard for equitable allocation of any additional revenue might reduce the burden of local sharing of capital costs.

It is recommended that consideration be given to some form of differentiated capital support that has relationships to approved costs of recognized facilities for a stipulated number of students and the sources of income needed. The supported share of the cost would thus be related to approved plans and specifications so that a total cost might

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[1] References have been made to these, particularly in British Columbia, Ontario, Quebec and the Maritimes.

be approved, which would imply approval being necessitated also of any extra specifications desired. An additional condition, under current financing procedures, would be the allocation of varying amounts of shared costs according to income sources for any local expenses. This might permit some specific support for equipment and site development. The provision of unsupported debenture funds for excess costs may have delayed regional recognition but it has not effected reduction anywhere in excess costs that developed.

In any event, need appears for some differentiated support whether it be established as some discretionary power of the School Buildings Board, or as a share of approved costs,or as a formula having regard for differences in regions, assessments, and special conditions.

Examination of building costs in Alberta indicates that many areas use all the support funds or more for the building and there is nothing left for furniture, equipment, or site development. The special provision for such support operates only in relation to favorable construction contracts. That provision and the bonus clause usually helps only those who are building very large schools or operate in beneficial locations. Only when specifications may be reduced or where good fortune prevails do many school authorities have monies from the support prices or from bonus provisions to spend on equipment. Any revision of regulations might remove provision of such bonuses that are currently beneficial only under special conditions.

Considerations for changes of support amounts would offer occasion for possible revision of the construction figures apart from assumptions about possible support for equipment. This implies that if any support for equipment and furniture were provided, it might be stipulated separately from that for the building itself. Such practice would be similar to that elsewhere, such as a specified figure in Manitoba, or support of an approved amount for approved equipment in most of the other provinces.

Occasionally there are requests for higher support amounts per sq. ft. for certain facilities such as home economics or science laboratories where electrical and plumbing installations are expensive. But, except for additions, these facilities are usually in large projects where the cost is spread over a large area. The size of projects usually influences the contract prices. It is suggested that any revision of

capital support might show regard for the differences in some proposed schedule of support according to the gross area of various buildings in addition to the current distinction for elementary and high schools. This might follow a survey by the Building Board or an appropriate study by some Committee such as one comprised of the Supervisor of School Buildings, the School Building Board, and representatives from the Advisory Board on School Construction.[1]

Cost of small additions usually exceed the support price considerably, especially where there is intention to provide mechanical services such as washrooms, science laboratories, heating facilities, or stages in gymnasium additions where the total space recognized might not justify portables to restrain expenses. The gravity of the situation is reflected in projects under 8000 sq. ft. which were shown in the chart on costs. The data prompt a proposal for consideration that support for small additions should be increased such as $1.00 per sq. ft. over the basic amount and a further 50 cents subject to approval if specialized facilities need to be installed. This might apply more specifically to areas where available portables cannot provide the functional purposes intended.

Another feature of control in some provinces pertains to the approved location of schools according to recognized attendance areas. The policy adopted by some urban systems, particularly in Alberta, for small attendance areas to reduce pupils' travel to the school may not be compatible with government desire for approval of an economical project that reduces duplication of many facilities other than actual.

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[1] Regulations concerning support are pursuant to the School Building Act (Sec. 5) state that they may include "a schedule setting forth with respect to school buildings of different sizes and for different purposes the limits in respect of which (financial) approval may be granted." It has followed that the School Building Board has periodically recommended revisions in the Regulations. It has done so after a review of costs and consultations with others such as the Supervisors of the Buildings Branch who has had long experience with tendering procedures, specifications, and conclusion of contracts.

The Advisory Board on School Construction has been comprised of the School Buildings Board and representatives from the Associationsof Architects and of Engineers as well as from the A.T.A. and A.S.T.A. It has considered the size of facilities and cost factors and has jointly sponsored with the A.S.T.A. provincial workshops on school design. Its meetings in the past year have been deferred pending further developments.

classrooms. This may be significantly related to requests in some districts for as many as six schools in a development area when three or four should suffice. The social attitude reflected may not readily accept a more controlled recognition of the number of projects although new controls on expenditures may resolve some of the problems. Recognition should not necessarily be determined by local policy when the major cost is supported from provincial funds. Control might be better established, as in some provinces, by approving the attendance area a project is to serve before acknowledging the facilities needed.

An additional aspect of cost control should manifest regard for the endurance of a building and for the operating and maintenance costs. Prevalent opinion favors fifty years as a minumum life expectancy for masonry construction with less endurance for frame buildings.[1] All provinces suggest that the quality of buildings should permit later additions or modifications. They are also aware that it is false economy to reduce specifications and initial costs that would result in high expenses for heating and maintenance. Buildings are usually of brick or massonry for extended life expectancy. Brick may cost more than cement blocks but the heat loss is less as well as the maintenance for masonry blocks which may need periodic re-painting.

A final observation on cost control is a requirement that before construction is approved, the existing accommodation be maximally used though it may require the moving of some portables on the conveyance of pupils from desired attendance areas to other centers with available space.

SUMMARY

The chapter indicates reasons for expecting higher capital costs, the factors operating to increase them, and the possible threat to the quality of construction if costs are severely restrained. The comments about financial implications of cost control pose a question about the extent of capital expenditures to be supported or shared and the nature of excess costs relative to new construction, additions, or supplementary expenses. The establishment of approved costs in different provinces for

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[1] British Columbia holds that a well-planned and carefully constructed frame building should last over fifty years.

separate projects is noted as well as the significance of controls on total costs. Attention is directed at financing problems in Alberta with expressed favor, if necessary, for a comprehensive study of specifications for recent or proposed buildings to assess their structural quality. Recommendations are suggested for some type of flexibility in support that envisages regional differentials and increased allowances for various types of additions. It is further suggested that any proposal for revised support might, after appropriate study of contracts, show the feasibility of a schedule of allowances according to the size of buildings as well as for their curricular programs. It is recommended that any changes in support figures for construction should be separate from any allowances that might be specified for equipment, furniture, or site development. Favor is expressed for establishing, for shareable support, the necessary expenses as an approved cost of a project that would permit some flexibility and yet provide overal control of total capital expenditure.

It is also noted that some cost control is related to approval of more building which should reflect regard for the most feasible utilization of all accommodation in a system.

CHAPTER X

COMMUNITY USE OF SCHOOLS

Community use of schools is not a new concept in many areas throughout the country although there have been problems about the amount of time that may have been accorded for their permissive use. Other problems have pertained to supervisory care of facilities, legal liability, and insurance coverage. But the trend has been toward increased use in response to the desire for lessening the duplication of facilities desired for recreational and extra educational services. Agreements are frequently concluded regarding rentals that envisage costs for heat, light, and caretaker services.

The general view prevails that school facilities are built for the instruction of pupils and that further expenses for additional features should not be incurred unless there is local contribution for the extra costs. However, school authorities usually favor public use of the buildings and frequently seek construction design that will facilitate it. A concise survey of practices in different provinces indicates this attitude.

British Columbia concurs in the view that the approved building plans might envisage community use by designing many features to provide convenient access for the public. The facilities mentioned all serve the educational function of the school for which support is given; it is directed that support for additional facilities for community use only is to be avoided.[1] However, there are many arrangements for the public to use the buildings.

Community use of schools in Alberta has been encouraged by various departments and agencies. It is generally recognized that reciprocal use of educational and recreational facilities in an area tends to reduce duplicated expenditures. An inventory of existing facilities showed an extensive array of sports fields, swimming pools, skating rinks, arenas, community halls, libraries and museums, as well as gymnasiums and school facilities under the direction of municipal or school jurisdictions. A large number of the municipal

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[1] The School Building Manual, p. 3.2.

ones are used in an organized or informal manner by the school. The desire of the public for the use of schools is reflected in a considerable number of uses by many community agencies. A large number of these agencies have understandings with school authorities for the use of existing facilities and payment for additional operating costs. Many areas have Recreation Boards and Directors. Government favor has been expressed[1] for any extension of this practice and it is hoped that in planning new facilities combined use may be facilitated. It is accepted that many of the facilities built for school use can also be used by the community and that additional ones for the use of community agencies only, could be arranged for in the construction of a new school. Local support for such additional facilities has been arranged in a number of centers.[2] Legislation provides for agreements for joint planning, construction, maintenance, or use of schools for various agencies of the community.[3] Frequently, these are arranged through recreation committees or other branches of the municipal authorities. Government Departments offer assistance in the cooperative planning and development of school-community facilities and programs.

Boards in Saskatchewan permit limited public use of schools but have on occasion accepted a community contribution for part of the cost of an auditorium-gymnasium.[4] Schools in Manitoba are extensively used by the communities. In Ontario, boards permit various community uses of the schools.[5] Many consult with local agencies concerning

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[1] A government statement expresses encouragement to school and municipal authorities that they consider costs of needed facilities and avoid duplication by cooperatively planning community buildings so that they may serve the educational and recreational purposes of all their citizens.

[2] Municipal or recreational groups in a few towns have conferred with boards about additional features not recognized in new schools such as bigger gymnasiums, kitchens, or large entrance foyers and have contributed the amount of additional costs for these.

[3] Section 92, The School Act, 1970. The section further specified that an agreement may be concluded for joint control and management or for establishment of a joint committee for constructing and managing the project.

[4] An example is at Raymore where the community is contributing $20,000 to the cost so that it may have extensive use.

[5] Section 12(4) of the Ontario Department of Education Act provides for regulations concerning recreation committees and directors.

presentations or desires about special facilities for library, music, or other recreational activities. Empty spaces in existing schools are wanted for various services or adult education in the daytime. Opinion occasionally appears for desired space in new schools for use by such groups as senior citizens, service workers, or those providing day-care or nursery service. There is provision for community support for the costs attributable to the facilities built only for community use as well as for the costs of supplies and services. This has occurred in a number of centers such as Thunder Bay, Balmy Beach, and Scarborough.[1] Joint-use occupancy has received attention as well as the use of sites. The Department favors playgrounds on the school sites, but accepts the idea that some recreational facility may be on it, particularly, if there is an adjacent park area. Reciprocal use of facilities is encouraged for possible economies; for example, school use of swimming pools which are limited in schools because of lack of funds. Quebec practices show an extensive informal use of existing facilities. Many of the physical education features are especially attractive to the public. Few extra features are provided for the community use of schools in the Maritimes, as the general view prevails that financial support is for school facilities. A few special features are noteworthy. The Canso proposal in Nova Scotia is for a community center including a large school.[2] Reciprocal use of the school and the community facilities is envisaged for the student and the public. In New Brunswick extra space is not usually built though there may be a relationship of the facilities to the activity of the community, as for example, providing more industrial education facilities if the area is industrialized. However, this may mean some reduction in other facilities to conform to a maximum gross area.

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[1] Thunder Bay planned a community school with special space for social dental, and health services with the costs analysed out of the total. Balmy Beach area has planned a Community School; it has been fully involved in retaining an architect and listing desired specifications. Scarborough has proposed a wing to a new school for a nursery day-care center. There is no expected department support for these features.

[2] The project estimated at 4½ millions involves Integrated Government control of Urban and Regional planning for approval of a large contribution. A very large library, swimming pool, and gymnasium are expected in the junior-senior high school section of about 50 classrooms.

Prince Edward Island provides few additional items. However, large foyers and kitchens facilitate community use as does the designing for convenience of many facilities.[1] Local desire for larger gymnasiums must be substantiated. Swimming pools have not been approved unless the communities paid for them. If tax moneys are involved the district can request a plebiscite for the extraordinary capital expenditure.

SUMMARY

This brief review shows widespread practice favoring community use of schools. Occasional expression of opinion indicated that many schools may have been designed only for the pupils without sufficient regard for the public or the municipal organizations and that there was distinct value of some channel of communication with the public other than through briefs or presentations about more building. It was noted that schools provide provincial services beyond those of the home and that these might be extended to more non-school activities. Generally, there was favor for designing school facilities henceforth for more convenience for public use as well, and that extra features for community use only should be provided by local support.

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[1] In some high schools, large classes of adults come after school for courses in cooking, sewing, or technical shop training.

CHAPTER XI

INNOVATIVE TRENDS

Various objectives and critical costs of accommodation have focussed attention on new educational processes and building plans and procedures. Significant among the new concepts respecting school construction are such items as systems building, project management, and changing viewpoints about design for open area or other features as well as materials applicable to new schools and existing ones.

One of the foremost innovations was the systems approach to construction. This implied analysing the elements into as many as ten subsystems and asking suppliers to tender the components separately with assurance of their compatibility with each other. Features of this systems building began early in Europe[1] and challenged interest because it proposed to replace the fragmented building procedures with factory production of many components to be coordinated on the site with an expected saving in time and labor costs. Its early emphasis was on the steel framework, precast systems of light-weight material for shafts, stairs, crosswalks, chutes, etc., as well as precast concrete wall panels sandwiched to provide thermal insulation. The potentialities were quickly evident and the idea was extended to interior features.

Interest spread as the urgency of time and burgeoning construction costs prompted attention to other alternatives. The Ford Foundation in 1958 established the Educational Facilities Laboratories, Inc. (EFL) which sought better design and building methods. In 1961, it established a systems development program (SCSD)[2] in California. This Facilities Council also proposed that many sections of a building cost be constructed simultaneously and that these factory-produced components of specified dimensions could be assembled quickly at a prepared site. Thirteen schools based on five-foot modular components were initially built.[3] Tendered separately, the bids were, reportedly, 18 per cent below non-system costs for the same components.

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[1] CLASP was an example. This Consortium of Local Authorities School Program worked initially with a steel fabricator to develop a simple building system for use in large buildings and schools. The Ministry of Public Works and Buildings (NENK) in England pursued similar procedures.

[2] School Construction Systems Development (SCSD). The Stanford University School Planning Laboratory also became involved.

[3] The 13 schools were designed by different architects with six basic subsystems of components such as framework, exterior surface, roof, and mechanical services.

Other areas noted the results and the movement spread.[1] In response to requests, the Ford Foundation in 1965 sponsored similar programs in Florida and Toronto.[2] The Florida legislature adopted the principle of an open systems[3] approach and the organization that was established[4] prepared detailed specifications incorporating flexibility and in two years built 28 schools at consideraable economy in time and costs. The volume of expenditure approximated 30 millions.

The School Educational Facilities (SEF) organization was established in Toronto in 1965 to conduct a study of facilities and to proceed with building proposals for about 32 schools. It was expected to seek flexibility and less costs for buildings by applying principles of modular construction.

The SEF group prepared estensive educational specifications and criteria for standardized components.[5] Elements of buildings were classified into about ten subsystems comprised of structure, atmosphere, lighting-ceiling, interior space division, vertical skin, plumbing, electrical, casework, and roof and interior finishing.[6] Tenders were requested for each subsystem which must include provisions for effective interfacing with the related subsystems. The proposal was that a systems approach would save construction time as it permitted fast tracking or overlapping of the phases of construction in that various components would be ready for assembly as needed which should reduce the waiting in the linear or sequential building on the site that takes more time and labor.

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[1] Reportedly, the S.C.S.D. program influenced systems building in over 1000 other schools. Boston, Detroit, Georgia, Massachusetts, Florida, and Toronto are examples.

[2] Some funds were made available from the Ford Foundation for the pilot project.

[3] Open systems means that the components of the subsystems shall be standardized and interchangeable; they may be produced by different suppliers with the specification that they must interface with other components for which the specifications are supplied. They may be used on any school rather than being prepared for interfacing in a closed system for one project only.

[4] Florida Schoolhouse Systems Project sponsored by the Department of Education and EFL Inc. The appraisal report indicated 4 subsystems were used in the first phase and 6 in the next. Initially, six elementary and secondary schools were built with different designs but with the standardized building materials of tendered subsystems. Savings were about 14% below estimates and very significant if the volume of a building program was well over 100,000 and approximately 500,000 sq.ft. Comments on the facilities were generally favorable.

[5] Standardizations were based on a 60" module to accommodate light fixtures and office areas.

[6] Not all features are in the system concept; some items such as site preparation, foundations, or basement work are tendered in the usual manner.

Obviously, savings for the site-labor costs would depend on whether the components produced in the factories were priced competitively and, possibly, on the productive capacity of the contractor's workers; otherwise, the final cost might be greater than for traditional building.

Building systems then, connotes a combination of standardized modular components coordinated into a finished project with provision for flexible movement of many features. Long spans facilitate maximum flexibility in the interior and other items may pertain to vertical specifications for appropriate integration in two or more-storey structures. Further considerations apply to exterior panels, weight for assembling, strength to resist climatic changes, and capability to accommodate various mechanical services. Such an approach envisages simplifying the traditional building process, duplicating basic components, and incorporating flexibility for future change. Immediate acceptance of identical components for similarly designed sub-systems might promote volume purchasing.

Effective development of a systems approach depends on careful educational specifications, the intended translation of those by the architect, and the production of the desired components by the suppliers.

The S.E.F. requirements were very prescriptive. Manufacturers were concerned about the volume of needs and costs when asked about changing the dimensions of many materials to conform with a five-foot module. When a potential school market approached $30,000,000 suppliers were asked to tender the specified components with the condition that they be compatible with the components of other sub-systems.[1] However, as costs of material and labor might rise later, an escalation clause was included whereby, in accordance with a "Cost Construction Index", the tendered prices could be adjusted.[2]

The S.E.F. program is the most extensive in Canada. However, some other areas have tried it. The R.A.S.[3] plan in Montreal is significant as one of the first attempts in North America to proceed with concrete structural frames. It soon removed three sub-systems of roof, exterior walls, and plumbing from the

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[1] Consequently, specifications for all related sub-systems needed to be available before individual suppliers could tender. A problem arose as to whether such requirements could be met without factory changes or whether some alternative might be permitted.

[2] Periodic indexes were issued; this escalation clause removed the commitment to firm prices and affected increased cost of the first four schools which had been estimated at $19.40 per sq. ft.

[3] R.A.S. - Recherches en Amenageme Scholaries which is part of a larger research group, (I.N.R.E.S.) Institut de Recherches et de Normalisation Economiques et Scientifiques.

There was general concern about determining the total cost before a project is commenced. Provinces that establish support in relation to approved cost were not enthusiastic about an "open systems" approach. Frequent expression declared that the total price must be known before commitments are made for early sections of the building. Over expenditure there might mean an appeal for upward revision of the approved cost or a lessening of the specifications for components that had been pre-tendered. In Alberta some statutory regulations might need revision to permit the separate tendering involved.

Acceptance is related to the volume of business that may be committed, It was occasionally suggested that a system might be developed for an urban need with some foreseeable volume in excess of 25 millions that would promote industry's attention to competitive bidding. Certainly, procedures involving much hand labor reach an optimum production rate faster than machine production. Standard components have another appeal. Under-utilized schools and use of portables or additions in other city schools emphasize the values of component units that can be attached or removed according to regional needs if favorable cost can be achieved.

There is considerable favor among boards as well as a few government agencies[1] for standardized components. Some assert that a closed system for integration of sub-systems may be simpler and less costly than an open one requiring interchangeability throughout all the projects. Such interfacing may require much expertise not readily available or subject to higher costs for the coordination service. Some boards are seeking a simple systems approach based on current tendering procedures with respect to contracting and available materials. This would require a general contractor as it might also represent a project management proposal whereby someone is engaged to coordinate and assemble the conventional items as well as the factory-produced ones secured to save time.

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[1] C.M.H.C. and the federal Department of Public Works and the BEAM program of the Department of Industry have favored the principle of Modular Construction.

The Fifth Conference of European Ministers in 1967 proposed exchange of information on school buildings in respect of financing, planning for location and design, research and development of new building procedures. -Resolution No. 4 on School Buildings.

The practice in New Brunswick is significant in that the government specified the components, approved the architects' plans,[1] and arranged the construction. However, completion times and costs were higher than expected. Specifications needed further refinement and it became difficult to predetermine all costs. The process has not been recently pursued.

There is limited practice elsewhere. In Saskatchewan estimated costs on a project were not initially approved and unexpected spending on the early sections left less for the rest with the result that specifications needed to be reduced if more funds were not forthcoming. The use of the systems prevented knowing the final price until the end. Nova Scotia also deplored this piecemeal system and showed little favor for it.[2] In British Columbia a school was built with some systems approach according to the modular components of the Toronto S.E.F. group.[3] Supplies were not available locally for the five-foot specifications and so the materials including the steel features were imported from Ontario. The five sub-systems included the structure, atmosphere, electrical, and partitions. The final unit cost of about $19.60 was somewhat higher than for conventional design but air conditioning was also included.

Costs, then, were generally higher in the country than expected.[4] The suggested ceiling figure of $15.00 was exceeded in New Brunswick. In the S.E.F. schools, alternatives and the escalation clause contributed to a final price above the original $19.10 expected, and increased the cost above that for conventional buildings, many of which also had open areas and moveable partitions.

Material costs were affected by the special sizes required; it is hoped that if the market expands locally and to other areas the prices will be more comparable to those for traditional materials that require more site labor. However, new labor contracts may soon raise the costs of labor for conventional building.

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[1] The architects were requested to use the catalogued components and work with the manufacturers for their improvement without jeopardizing the standardization feature.

[2] A few proposals there for sub-tenders indicated desires for escalating costs.

[3] An elementary school constructed in the Delta S.D. (Ladner) by the district's building crew. Open area, special lighting, and carpets, are featured.

[4] Florida, reportedly, held increases down to 28% whereas conventional building costs rose 61% during 1967 - 1971; further more, the contruction period last year was reducted from 12 to 38% - Reported in Educational Summary, November 26, 1971.

Significant items about the S.E.F. schools include the economy of construction time, much flexibility, and special features such as high live-load level, air conditioning, sophisticated electrical services, and very adaptable equipment and furniture. A closed system for integration of the sub-systems in one project may be simpler and less costly than one requiring interchangeability throughout a system. Such interfacing may require much expertise not readily available or it may be subject to higher bid costs.

The cost of factory-produced components whether for open or closed systems needs to be part of the comparative cost analysis; other considerations pertain to the technical performance of each sub-system, and to subsequent operating and maintenance costs.[1] More exploration of cost/quality features should precede adoption of the open systems of construction. Several studies have been initiated.[2] A feasibility study[3] in B.C. indicated the capability of industry to produce the requirements, and favored the consideration of an open systems approach after some appraisal of costs and quality. It indicated that the government and the boards might coordinate building programs of various districts for organization of a market for systems components.[4]

Some reluctance or delay in acceptance may arise because of new dimensional requirements. This implies commitment for a volume of purchase and possibly some concern about the compatability of the components with features of existing buildings, particularly, when much construction pertains to additions. Relocatable factors may also be involved.

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[1] Considering a structure's life expectancy, a component may be only 1/8 of the final cost in relation to maintenance costs.

[2] (a) A report of the Canadian Technical Mission on Prefabricated Concrete Components in Industrialized Building in Europe; Sept. 2-22, 1966 noted the increasing dependence on factory production because of the deterioration of skilled labor, the size and adaptability of components (huge exterior wall slabs), and the speed with which these could be assembled in a flexible building. It recommended further exploration of the performance results. (b) Many reports are available on new buildings in Europe (Model Building System), Florida, California, Toronto, and elsewhere. Several may be secured from the Ford Foundation in New York. (c) The BEAM study of Federal Department of Industry.

[3] Report on the Feasibility of a Systems Building Programme for the Construction of British Columbia Schools, (Dec. 1969) by Dr. Robin A. Clarke.
It was recommended that the government and Trustees' Association establish a Provincial School Building Consortium as a fiscal and legal body to implement the phased approach to sponsorship of an industrialized building system. It also recommended that boards' legal documents for tendering be prepared by a Research Design and Development Group responsible to the Building Consortium.

[4] Manufacturers may be obliged to standardize the product, develop a production process, control its quality, and create a large market.

Widespread opinion prevails that available materials can be used or modified rather than fabricating new sizes. Some adjustments have already been made in bricks and cement blocks to accommodate each other and the mortaring to a 16" size. The "golden dimension" of 4" is still highly regarded and its multiples are significant for many features.[1] Changes for schools only will not be readily acceptable or economical, unless there is a much larger demand relative to commercial, institutional, and residential building.

This implies a careful survey of the market and industry's capacity to readily alter its products. A systems approach with new requirements might promote greater industrialization in stablizing a known market for more capital intensification of methods if the rationalization were supplemented by management organization of all construction into a coordinated system of pre-determined goals.

However, the implied benefits might arise under current production in a systems approach that standardized specifications; this might encourage more bulk purchasing. It is asserted that many schools using available materials demonstrate flexibility, open areas, and possibilities for adaptability and expansion. Mechanized construction could be promoted by extensive prefabrication of items such as wall panels integrated with air and electrical ducts to be hoisted into place for attachment to the structural framework.[2]

Acceptance may have been impeded by the lack of esthetic appeal of some of the buildings, but the size, shapes, texture, and color of precast concrete could possibly enhance appearance. Another factor is that many projects have used only a limited number of sub-system components and left the rest to conventional construction. However, one conference[3] concluded that using some subsystems was more practical for many small districts than importing a total package.

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[1] Structural steel or cement members, 2' x 4' ceiling tiles, 4' x 8' demountable wall systems, packaged heating, ventilating and cooling units of standard capacities, standard doors, windows, and frames permit open specification and performance bidding. Often the use of such standard items along with local millwork results in shorter construction time and cost economy.

[2] Prefab steel building with factory-insulated walls and very long spans may have many interchangeable components and be useful for permanent or relocatable purposes. Moreover, the final cost of such building is known initially.

[3] C.E.A. Conference sponsoring a seminar on the S.E.F. facilities in 1971.

initial proposal for eight sub-systems. The program was more a closed system and there had been concern to placate labor regarding the factory prefabrication. The buildings manifested flexibility, air conditioning, and high quality hardware. However, progress with systems approach has declined, - possibly, until completion of some prototypes indicates encouragement. In other centers a primary and high school are being built by systems approach for the structural, mechanical, inside partitions, and electrical components. Proposals for other schools were not pursued as apparent costs for the two commenced ones were higher than for traditionally built ones.

New Brunswick commenced five elementary schools in 1968 and proposed three more according a systems approach developed by the Department of Public Works.[1] Expectations were for faster completion, cost economies,[2] and standardized components related to five-foot modules. Proposals for prefabricated packages were not favored as they lacked features of flexibility and did not provide for use of much of the province's materials or labor supply. Suppliers promised the specified materials and were permitted some price adjustments if costs increased after a given time. The Construction Association sought assurance that provincial contractors could tender all projects and that it would not be necessary to import labor with special skills.[3] Individual depository subtrade bids and delivery times were invited for eleven sections[4] and the general contract tender for assembling them was to be subsequently submitted to the Department of Public Works.

The schools were to be built according to the Component Construction method. Structural systems and exterior wall cladding were pre-tendered to ensure compliance with the time schedule. Bids on all other components with stipulated delivery dates were to be submitted to the general contractor.

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[1] Port Elgin, Priestman St. Elem. (Fredericton) Forest Hill, Val D'amour, and St. Joseph were specified with further proposal for Belleisle (12 room) Rogersville (18), and Campellton (24).
The New Brunswick Component School Construction approval was devised for schools of at least temporarily six teaching stations, but preferably twelve, with five-foot modules because of experience elsewhere in respect of light fixtures, heating equipment or other fixments which would likely be imported.

[2] Proposed budget figures were 1100, 1500, and 2500 respectively for elementary, junior high, and vocational schools based on past costs and hope that multi-use of facilities would reduce the space per student. The hope may have been to get standard components for many public buildings in the province and possibly, the suppliers hoped for outside markets.

[3] Government policies specify that school contracts shall provide for job management and purchasing within the province.

[4] Sub-contract bids were for: Electrical, plumbing, heating and ventilating, roofing, carpeting, resilient seamless flooring, acoustic tile, painting, chalkboards and tackboards, removable partitions, and cabinets.

PROJECT MANAGEMENT

Project management has operated in various building projects throughout the country and in a few schools in some provinces.[1] The idea of systems approach for school construction has prompted more proposals for project management of it to coordinate the interfacing of the sub-systems with each other and with those components not pre-tendered for scheduled completion of an integrated project.

Usual practice has been for the architect to incorporate the structural, mechanical, and electrical components as well as other requirements in the specifications and the general contractor assumed responsibility for the tenders from sub-trades and the total coordination of the processes involved according to the planning of the architect. Thus, the architect acting as an agent of the owner, supervised a project from the design to the completion. Awarding the construction contract to the lowest bidder has been customary policy although it does not ensure high quality work nor sufficient protection to a board from subsequent bids by poor builders.

Proponents of project management assert that separate sub-system tenders and the increasing size of buildings emphasize the need for a project manager to assist the planning and supervise the construction and administration of the one or more contracts. A few firms, and, occasionally, an architect have offered this service. Sometimes, architects have suggested they would like to merely administer the contracts without supervising the details of construction. Consequently, a board would likely have additional fees for a manager if the whole project had not been tendered by a general contractor. Many proposals for project management in a systems approach, apparently, exclude a general contractor but suggest a manager serving between the architect and the sub-trades to provide the coordinating services and pursuit of a critical path in the construction process. Suggested advantages have pertained to having the manager secured early to act as part of a planner-design team with the architect and the owner concerning the general plan for the project. This might have added significance under special conditions such as a systems approach and might facilitate more saving of time. However, a distinction between a projects manager and a construction manager is noteworthy.

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[1] Suggested examples may be public buildings or university structures. Although the specifications may have resulted in retention of construction managers rather than the more extensive services of project managers.

In practice, few building systems procedures have specified the retention of project managers for school building. In a Saskatchewan school one architect from the consortium was put in charge of the project. In Quebec, the Department of Education's only experience with project management in one school was inconclusive although the procedure did not restrain the manager from adding features as that final costs exceeded the budget figures for the first components.

A projects manager may set a fee for his services but the total cost may not be known until all sub-systems are installed in the completed project. Many viewpoints favored having one contractor in charge of all the bids and responsible to the board cost initially. It was noted that as only some of the sub-systems are frequently pre-tendered, the bids may be assigned to the general contractor. Much of the other work would need a general bid anyway. With independent bids a general contractor may feel he loses control respecting quality and time of delivery of goods. Furthermore, many components may need some adjustment on the site for interfacing for which a general contractor may assume full responsibility if sub-systems tenders are accepted by him. A project manager may have no financial responsibility for additional costs arising from strikes or other factors and these expenses may devolve on the owner. Other problems might arise concerning purchasing procedures, inadequate specifications, or changes desired out of regard for performance criteria such as climate control units. A project manager may need to resolve differences in professional views such as those of an architect and an engineer.

Most opinion favored an inclusive cost contract secured by competitive bidding for a completed project and indicated that pre-tendered prices of the components of any sub-systems specified should be incorporated in the overall contract.

BULK PURCHASING

An expected cost benefit should accrue if suppliers might tender on large amounts of standardized components to be used very soon. Such benefit may not extend over long periods of time. Though assured of large purchases, suppliers may be reluctant to give firm tender prices applicable to deferred delivery dates without agreement for adjusting the price later. Many suppliers cannot get firm prices themselves except that they accept the goods at once and so most of them bid on tenders at current prices; if delivery for some projects is later then a higher tender would offset anticipated benefits from bulk buying. Districts

that have talked of a million to two million sq. ft. of construction area over two years may find they must take delivery of the material when tendered or agree to later price adjustments of the pre-tenders. This, of course, detracts from establishment of a total estimated cost for a building; on the other hand, if they must take the material within a limited time, boards may have expenses for storage and distribution.

It is thought that bulk purchasing can apply most beneficially to projects for immediate construction which show sufficient volume to encourage suppliers to refine their products for competitive bidding. If modular components of standard specifications were to become mandatory some organization of a wide-spread market could possibly develop which might foster industrial competition for provision of the most appropriate facilities to match school innovations. Perhaps some zoning of areas would resolve some cost delivery problems. To facilitate further innovations educational demands and products should be evaluated periodically and revised according to user requirements and performance criteria. Some may be used only out of regard for cost budgets. Exploration of new materials or combinations of them for school use might be significant as well and provide another reason why boards may not wish to commit themselves for large purchases to be used in the future.

Large systems or a number cooperating together could establish a demand for an attractive volume of standardized components;use of similar ones in other buildings should also influence the market conditions. Many large districts are now benefitting from large purchases of floor covering, millwork, and other materials. The main development pertains to more standardized components and the large scale purchasing of them if cooperation, time-scheduling, zoned region deliveries, and other problems can be resolved.

DESIGN

An outstanding design feature for flexibility has been the open area concept evidenced, particularly, in elementary schools throughout the country. It has usually represented the space of several classrooms surrounding or including the library.

In nearly all provinces the open area includes the corridor space that would have been eligible for closed rooms. Apart from this the space is usually limited to the area of about four classrooms as in British Columbia or in Manitoba where it is required that at least one-third of the instructional area must be in

standard classrooms for students and teachers who find it difficult to operate in an open area.[1] Open area varies among schools. There is more open space in elementary schools than in junior high school buildings which in turn have more than do the secondary ones. Saskatchewan also approves open area that permits assembling two or three classrooms for special instruction in a functionally designed environment. Many boards have not subscribed to the concept yet. Ontario elementary schools are also planned for only part to be in open space although the S.E.F. schools have little closed area. The systems approach usually planned the equivalent of six teaching spaces in each open area. Some concern has arisen about the best use of large areas and possible need of some smaller closed rooms or of balance between open and closed spaces. This may arise also in Alberta where very large open areas do not always show a proportionate number closed classrooms.

Though many elementary schools in Quebec have much open area some districts are designing new schools with partitions that can be removed later, Three elementary schools in the Montreal Protestant system have small open areas comprised of about two classrooms and a library. Nova Scotia usually limits such space in elementary schools to the equivalent of about four classrooms and uses folding partitions. Prince Edward Island also limits the open area to clusters of three or four teaching stations each. Tracks permit folding partitions to enclose sections of the open area and there are also some closed rooms as well. Open area is featured in new elementary schools in New Brunswick and guidelines indicate that large activity spaces or lecture rooms may be incorporated as open area. Favor is for a cluster of three open and one closed. Newfoundland has no policy yet, although open area is featured in a new school and planned for some others.

There is little open area in high schools except where two rooms or so may be opened up for space variability. In new construction apart from additions limited spaces are provided in a few provinces.[2] Slow acceptance may be associated with identification of facilities for particular subject purposes.

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[1] It is specified that such classroom walls shall be non-bearing for easy removal but it is also required that open areas must be so built that walls and corridors may be later installed if desired.

[2] (a) Design for the Oliver J.H.S. in Ladner, B.C. shows four classroom equivalents in areas next to possible corridors.
(b) The John Diefenbaker H.S. in Calgary has some variable space by demountable non-bearing walls which can be easily moved.
The Bishop Carroll school in Calgary has large open areas as a result of subdividing the approved instructional space according to its program. There are in the total area of 128,780 sq. ft. nine resource centers with carpeted areas varying from 1200 to 2400 sq. ft. for different subject activities.
(c) Chamblay in Quebec is planning three high schools with easily-removeable partitions to permit experimentation with the open area concept in the high schoool.

There are reservations about the open area concept. Costs have usually been higher than for traditional building. The expected savings have been offset by costs for long beam spans, acoustical features of floors and ceilings, and, in some cases, the inclusion of expensive full-length dividers or moveable partitions. Special ventilation and more lighting farther from windows may also increase costs. The flexibility advocated has been examined. The idea is significant for team teaching, flexible time schedules and grouping, and multi-media experience. Favor varies. Some laud advantages of possible large group instruction though others point out this is most beneficial to the top group only and that many pupils get lost in large groups and become dissatisfied if they do not have much directive attention. Observations are frequently conditioned by regard for the effectiveness of the learning environment, as well as the attitude, experience, and qualifications of the teaching personnel.[1]

Reservations pertain to noisy activity of too many classes, confusion of some pupils, and frustrations of teachers emanating from the overall conditions and incompatability with associates and failure to fulfil the purpose in some learning processes related to student self-inquiry and team-teaching. It is difficult to establish meaningful per-teaching stations desired for some subjects. Limited wall area sometimes results in less cupboards, bookcases, or storage spaces for instructional and pupils' supplies. Much caution is manifested in the attempts to limit the amount of space in each open area and in the incorporation of corridor space to facilitate later enclosure of any facility. The designs may reflect regard for adaptability or they may reflect indecision about the educational specifications or future school needs.

There is an abundance of information about practices, apparent educational and psychological benefits, and some cautions as well. Many of the comments about open area are but expressions of controversial opinion. However,

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[1] Some systems have had teacher seminars about the use of open area and others recommended it.

a number of studies[1] have been initiated, which should indicate future directions.

Besides the proposals for relocatable schools there have been ones for multi-use buildings and air-supported structures. The emphasis on multi-use high rise buildings incorporating school accommodation has arisen where land is scare and very expensive, as in New York. The proposal there was to construct a high-rise building on a school site, replace some of the playground with roof facilities, and secure some capital costs of the school section from rentals of the residential or commercial non-school section and from the sale of air-rights. Alberta and Toronto studied[2] it and concluded that the educational effects on pupils were not yet clarified, that playgrounds were still wanted, and that land scarcity and costs did not currently warrant recommendation for its introduction.

However, some two or more-storey schools reflect regard for availability and cost of land and playground areas.[3] More such buildings are proposed in Nova Scotia and in cities such as Montreal, Toronto, or Vancouver. Multi-storey schools may be designed as a safeguard for playgrounds if added enrolments demand more building. Cost benefits may also accrue in respect of roof, foundation, and more vertical systems of pipe and conduits.

Another proposal associated with reduced sites pertains to articicial turfs for roofs as well as athletic fields.

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[1] Toronto is conducting a study of the open area concept for K-VI grades. Calgary has initiated a similar study. A study for Edmonton (by Dr. Naomi Herson and Dr. A. MacKay of the University of Alberta) concluded the full potentiality had not yet been realized that some of the problems were not unique to the open-area situation that teacher-exchange visitations might be helpful, and that some enclosed areas are needed. Dec. 1971.

Other statements from the system indicate that four-classroom areas are sufficient for elementary grades and less would be preferable for junior high pupils; and also that there is need of closed spaces, seminar rooms, and carrels for small groups or individuals.

The New York County Board of Education has completed the first stage of study designed to compare the learning achievement of pupils in open area and traditional schools in reading and mathematics. It was noted that planners and architects regard open schools as a necessary response to less rigid teaching techniques and that educators generally approved the open-plan schools as providing better learning environment for the new curricula. The study concludes there are no significant differences in the areas examined. - Reported in New Dimension (Nov. 1971, p. 13), published by the Ontario Department of Education.

[2] (a) S.E.F. Study on High-Rise Multi-Use Schools in New York; Toronto, 1970.
(b) Report on Fact-Finding Visit to New York to Study Implications of Incorporating Schools in Multi-Use Buildings; - Government of Alberta, 1970.
Planners talk of high density areas and promote ideas of educational parks. There may be a growing need in some cities for reorganization of land use and careful use of publicly owned and expansion-area land to ensure appropriate developments.

[3] Edmonton has some schools with sections of five storeys.

Attention has been directed to inflatables as unit coverings for gymnasiums or swimming pools. In Alberta, a dome building is air-supported in Ft. McMurray and a few temporary air-bag warehouses have demonstrated possible values.

Improvements such as double walls and separate sections offer more control regarding temperature and damage. Such air-supported, cable-restrained structures or bubbles have been used elsewhere[1] for roofs, stadiums, and residence developments. Research is proceeding for use of the membrance for more encapsulated space and for new forms of skin materials.

Design has tended to reduce windows to seek economical construction or solve some technical problems and with, possibly, insufficient regard for the pupils' welfare. Little has yet been verified about psychological effects, sensory deprivation, or lessening of cellular rhythm as a result of working in the special surroundings under artificial light. Thermal environment has been emphasized more than natural lighting and has promoted desires for air-conditioning.

Architects, engineers, and contractors have sought within budget limits to improve buildings with such features as constant environment, humidity control, better ventilation, and air filtration. More air-conditioning has been installed and, though numerous schools do not have it throughout, many of these have been designed for its later addition. With more concern about anti-pollution and allergies environmental control may be intensified with more design for air-conditioning. Opinion varies about design for roof types or central systems. There is huge production of prefabricated control equipment of a modular concept with more noise control and solid-state thermal-electrical heater-cooler devices with chemical fuel cells are now emerging.

Creative innovations have arisen for many functional features such as inflated furniture, plastic equipment, large hollow blocks, snap-on shelving, and moveable blackboards. Much of this has multi-use and may be produced locally rather than by custom purchase.

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[1] La Verne College in California; College housing at Princeton University; athletic facility and greenhouse at Glen Cove, N.Y.; an athletic facility at Harvard University; a large mixed-use one for Friends Select School at Philadelphia. A complete school was erected in Kansas. Humber College in Etobicoke and Trent College in Thunder Bay each have gymnasiums. Kuwait has a complete school 750' in diameter and 250 ft. high for 6500 pupils. There are many in Sweden.

GENERAL COMMENTS

Any review of practices and proposals emphasize the value of design research. Such study might focus attention on new concepts, various materials, and changing goals. Local desires for innovations may vary from those established by an accumulating body of research. Design is always affected by considerations of city planning, population changes, and codes as well as industry's role in production. Architects, engineers, and industry might be a very important part of a team studying possiblities of future design. Manufacturers might serve more than an service agents and their research efforts may be very significant.

Another dimension has been apparent in the suggested computer-use for design and construction. The Simu-School Project[1] in the States emphasizes such possibilities and also indicates its use for depicting actual conditions and simulated ones. Such service may be valuable for training facility planners in special programs or in a Faculty of Architecture.[2] It is sometimes asserted that designers need more knowledge about construction methods.

Various groups have conducted studies and held seminars to review significant features, exchange information, and consider some uniform standards. These were generally informal but some of the views may have influenced those retained to design buildings.

Benefit should arise from some interdisciplinary research on all interrelated aspects carried on continually to secure advantageous results. Concerning Alberta, it is suggested that the Department of Education carry on research studies through its Building Branch. One type of study was commenced in 1969.[3] Research might explore recent innovations and it might include analysis of the nature and cost of the buildings elements, fixtures, and equipment. The coordinator of School Buildings and the Supervisor of the Buildings Branch have periodically

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[1] Dr. Joseph Hannon is Director in Chicago of the Simu-School Project which is financed by the U.S. office of Education under work of the Council of Educational Facility Planners. A review of the work has been presented a few times by Dr. Donald Burr to school authorities in Alberta.

[2] Dr. Dr. Lew, Director of the School of Education in San Jose has introduced a planning course for school designers.

[3] The Department sponsored a "Research Report on School Construction" by Reid, Crowther and Associates. The writers urged that this was but one phase of a study that should be continued. The overriding interest in financial analysis and budget control perhaps eclipsed the significance of comments on structures and deferred further study of alternatives in materials, design, and functional features. Nevertheless, it identified particular items and revealed fields for further investigation.

indicated new developments in construction and program. Planning Branches in other provinces have done the same and some have employed architects on their staffs. However, much of their time is devoted to details of actual building proposals. There is apparent need of full-time professional attention to building procedures. It is suggested that the Alberta Department secure the continuing service of an architect or engineer in its Building Branch. Such service would be helpful concerning new design proposals, costing specifications, and analysing estimates for renovations or upgrading costs subject to support.

There are many recent buildings and much information about new materials[1] and design. It behoves the Department to assume a distinct leadership role in this field. The School Building Board has a vital interest and, certainly, others involved in buildings would welcome opportunities for any special studies. An Advisory Committee could suggest many parameters, comprised as it has been of representatives from closely allied groups. Undoubtedly, the construction industry could augment the viewpoints significantly. Benefits should accrue if the Department arranged for an in-depth study of new buildings relative to design, materials, and functions including the viewpoints of the teachers using them. It has been previously suggested that there should be a quality/cost analysis. Some prototype might be recognized for educational and technical specifications with all possible use of standard components as a basis for future decisions.

It might be possible, with architectural advice, to establish some pattern book of comprehensive and universal standards after appraisal of judgments, and research of all factors involved. The information arising from such study should be shared.

Organized structure of communication for the innovative efforts of industry, designers and contractors, educators, and government and school authorities should serve to advantage. An advisory committee might consider architectural and program designs and means of interpreting these into physical form as well as exploring developing concepts and disseminating information about them.

Design is related to the distribution of space for the recognized facilities and the commitments a system may have for idiosyncratic or single-purpose areas. It reflects regard for form, structure, functions, technical capabilities, climatic conditions, and available materials. Architects should be informed clearly about desired facilities and budget figures. Thereafter, they may, for

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[1] e.g., A glass fibre reinforced plastic school has been recently erected at Frobicher Bay with large light-weight exterior panels bonded to urethane foam insulation.

for similar enrolments, design different types of buildings according to their creativity and knowledge of new materials and techniques. It is questionable the varieties of actual design have contributed greatly to rising costs as many architects have, commendably, designed buildings within support prices or approved costs estimates. This has maintained favor for individual design rather than for development of standard school plans for similar construction throughout a province.

Possible benefits from systems approach, standardized components, and bulk purchasing may prompt some proposals for a uniform provincial design for different sized buildings.[1] No government has assumed the design-planning of a school unless specially requested by a board to do so.[2] Only some sub-systems are yet included in a systems approach; it is questionable that any government should become directly involved in designing and, particularly, in a systems approach until its effectiveness has been more fully explored.

It is doubtful that a building would be designed any better than by some private architect under competitive conditions. There would still be need of more specifications beyond any standardized components to make a final plan applicable to various locations, soil conditions, and general supervision of the construction. Provincial legislation frequently stipulates that most buildings must be designed by professionals, usually architects, in accordance with statutory requirements relative to health, safety, and fire protection. Further developments might warrant a requirement that standardized modular components must be specified.[3] Everywhere, architects have designed the plans. Even in Prince Edward Island and New Brunswick where the Department of Public Works arranged for the construction of the buildings, the design planning has been done by private architects to ensure more variety. The building supervision by the Department of Public Works has been discontinued in New Brunswick. It never had acceptance elsewhere.

It is hard to predict what design will be in a few years. Towers and cable television are but another feature of technological developments and

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[1] Such adaption on a provincial basis should have a data collecting procedure and a built-in type of continuous appraisal.

[2] Upon request of some boards, the School Planning Branch in British Columbia designs and supervises the construction of a number of "pilot" projects with with a view to applying modern techniques and cost savings procedures. A board may request the original planning as in the case of an eight-room Allandale School near Victoria.

[3] New Brunswick requested architects to specify the modular components it had developed.

new learning processes that will influence requirements. Architects assert that permanent buildings are outdated and, certainly, that masonry partitions should not be installed. Regardless of the life expectancy of buildings they will, undoubtedly, feature adaptability and flexibility for internal change and rearrangement of space. Environmental, behavioristic, curricular, and economic factors may increase in significance in any interdisplinary approach to the design-planning.

CHAPTER XII

SUMMARY, OBSERVATIONS, AND RECOMMENDATIONS

Legislation and regulation exist in every province as legal authorization for building schools and financing their costs. Procedures are also stipluated for boards to borrow funds and provide for repayment.

Statutes in New Brunswick and Prince Edward Island authorize the government to construct and pay for approved schools and in Newfoundland to pay a grant as a share of the approved cost. Boards of the remaining provinces must have borrowing approval by some form of government authority either by a Finance Board within the Department of Education, a provincial Municipal Board, or a local authority with extensive autonomy. Occasionally, the approval of the Department precedes that of the Municipal Board. In several the approval of both the education and municipal authorities is involved in a liaison procedure, particularly, where tax rates are not specified. Further supervision is evident in some provinces through approval of budgets that include proposed capital expenses. Legislation usually stipulates that government approval must precede any capital expenditures. Debenture funds are secured through some government Corporation or Authority although both Saskatchewan and Nova Scotia boards must sell about half their issue on the open market. Those eligible for support are debt serviced annually from provincial funds.

Provincial requirements that school districts maintain an adequate educational program assumes that some obligation devolves on the government for assistance. Statutes in all provinces authorize financial aid for capital costs. It is generally agreed that the degree of government support must be restricted or conditioned by some approval of the building plans. The assistance is invariably a share of the costs except for the governments' construction expenditures in Prince Edward Island and also in New Brunswick where all local taxes are paid to the provincial government which owns the schools. Elsewhere the assistance is related to the approved costs of individual projects or is specified as a maximum amount of support. In Manitoba and Quebec this generally pays the costs although special allowances may apply or specifications may need revision. In Ontario and Nova Scotia as well as in British Columbia and Saskatchewan assistance also varies according to the assessment in various locations.

Each province, other than Alberta, provides identified support for approved costs of recognized furniture, equipment, and site development. Except

for vocational equipment, support is not specified separately in Alberta and only occurs when construction tenders are below the support price. All provinces support a large share of the cost of approved vocational equipment They all support approved costs of renovations and recognized portables. Special conditions apply in some provinces such as sharing costs for approved sites in British Columbia and Prince Edward Island or swimming pools and covered playing fields in Quebec. Reports indicate continual appraisal of existing conditions, tender prices, and cost factors for periodic adjustment of financial support.

Statutes reflect country-wide opinion that some government authority must approve building projects for which financial support is expected. This function is performed by the Department of Education in each province, except in Alberta where a special Buildings Board considers applications.

Provinces generally pursue similar procedures. These require boards seeking facilities to submit information about existing buildings, projected enrolments and programs. Most boards must submit estimated costs of proposals as approval of plans and specifications is related to them. All provinces issue approval of need, spaces, plans, and tenders. Some, as British Columbia or Quebec approve every sequential step concerning recognition, working drawings, specifications, and tendering in a continuous control; some, such as Saskatchewan and Manitoba also approve specifications in relation to the costs to be supported. Specifications are also approved in the Maritimes. Others may not formally approve each step. Alberta, Ontario, and Newfoundland approve the building plans with a ceiling amount of support; but they do not approve the specifications so that excess costs may appear in the tenders. Final building plans in Edmonton and Calgary are not subject to approval.

Architects usually prepare the specifications and design the plans. Government authorities in all provinces specify the eligible space and indicate the amount of the approved cost or financial aid to be given. In five provinces unsupported debenture funds are available for excess costs although distinctly limited in two of them. No debenture funds are available for areas not approved for support. Governments determine what expenditures are for capital and eligible for assistance. All local jurisdictions - usually school boards - desiring debenture funds must pass bylaws for borrowing according to statutory requirements and arrange for plebiscites if required. In Nova Scotia municipal councils are responsible for the bylaws and sale of some of the debentures.

Each province requires government approval of tenders which must be submitted under competitive bidding. It is also required that contracts will not be signed until all financing arrangements have been approved.

Most provinces issue directives or manuals concerning applications for buildings and funds as well as tendering procedures. Many of the instructions are very detailed and in some provinces quite prescriptive. Chances are possible if new design conditions such as modular construction warrant revision. Concerning recognition of facilities, a few provinces, such as Saskatchewan and Nova Scotia do not require fixed areas and their suggestions serve as guidelines for the individual projects submitted for approval.

The regulations and directives reflect a principle that recognition is for instructional facilities for a stipulated number of pupils plus such additional non-instructional space as deemed necessary to establish a gross area. This is all subject to support in most provinces although in Nova Scotia support is provided for the instructional areas or grantable space and in Ontario related non-instructional space is incorporated with the functional floor area into the Accommodation Units established for support. New Brunswick suggests sizes for different facilities but also suggests a range of space per pupil for them indicative of a gross area. However, much of this applies where vocational courses are provided and where the province itself approves the final plans and oversees the construction which provides specified instructional facilities. Policy is not evident in the country for allocating an amount of funds or gross space per student.

A few provinces decide on the size and location of schools to ensure broader programs, larger service facilities, and less duplication than where more schools, locally chosen, may be closer to each other. There is general concern for pupil-loading in teaching stations and for maximum use of space. Practices throughout the country show that building approvals have regard for needs, regional conditions, and projected school populations. Everywhere the declining enrolments and lower birth rates have emphasized caution about recognition of more space and encouraged use of temporary alternatives such as relocatable units or conveyance services.

In all provinces curriculum personnel express views about facilities either by consultation or by representation on the approving board. Facilities are acknowledged according to provincial programs and so may differ because of the priorities involved. For example, though the ones for Home Economics or Industrial Arts are similar in many provinces, they may vary greatly in some

schools according to the emphasis on occupational or vocational training. The same variation applies for physical education facilities which appear extensive in Ontario and Quebec although choices of suggested ones must be made. Lunchrooms in many centers seem extra but they must serve other uses as does ancillary space elsewhere. In the same manner theatres or auditoriums, when approved, must serve multi-use functions.

However, the range of space per student is comparable throughout the country. Amounts of 65 to 75 sq. ft. in the elementary to 95 or so in the junior high and 100 to 115 in secondary schools with extra vocational allowances are common for similar school populations. The areas for classrooms, homeroom science labs, storage, and instructional media centers are similar in most provinces. All provinces approve additional area either by ancillary space, special subject rooms, or large divisible areas such as auditoriums, lunchrooms or general activity spaces. Vocational facilities are general though they may vary according to the organization of the program. Five provinces support facilities for kindergartens that may be used by two groups daily. Structural materials, case work, general finishing, attractive furniture and much sophisticated equipment show commendable features throughout the country and reflect high regard for comfort and convenience. Roominess and open areas are characteristic in the design of many new schools. Portables or relocatable buildings are used throughout the country with common purposes related to temporary needs or small increases in enrolment.

Community use of schools varies widely. Authorities have shown increasing favor for the unifying benefits; there is considerable use and increased effort to plan some of the new facilities for the convenience of the public. Opinion generally prevails that costs of desired features beyond the need of the school should be assumed locally. More agreements are considered respecting liabilities, supervision, and operating expenses.

Costs vary because of the different items included in the computations. They all include the construction contract, professional fees, adjusted sales tax, and some contingency sum. Most provinces also include expenses for site development and approved furniture and equipment and a few include some costs for site. In British Columbia, Ontario, and Saskatchewan costs have been related to the amount approved for specific projects. The establishment of approved costs permitted flexibility and provided for differentials concerning the nature and size of projects, regions, season of the year, or other special conditions. Quebec and Manitoba approve cost estimates but both use ceiling support as guidelines so

that specifications may be revised for closer conformity. Cost figures may be adjusted with norm school standards and show regard for isolation, special equipment, or particular requirements. Ceiling amounts of support for building have also influenced costs in Alberta as architects were urged to design accordingly. However, excess costs have arisen partly because of special features or have occurred for site development, furniture, and equipment which were not included as part of the acknowledged cost to which the support amount applied.

Construction cost averages for elementary schools have ranged from \$13.45 in Alberta and \$15.19 in Saskatchewan to \$18.50 in Manitoba, to \$19.50 in Ontario and to over \$22. in Prince Edward Island. Average construction costs for secondary schools in Alberta, Quebec, and Saskatchewan have corresponded closely to ceiling support allowances. In other provinces they have ranged from \$21.50 in British Columbia to \$22.19 in Ontario and to \$23.00 in Prince Edward Island. This is apart from further costs for site development or equipment.

Unit costs for small additions have usually exceeded those for new projects. Their size and nature has been particularly significant in Alberta where costs ranged from \$14.66 to \$19.96 in 1971 and from \$15.12 to \$21.16 in early 1972.

Forecasts of rising costs are based on current market conditions, recent tenders, negotiated wage contracts, and price indexes. Identified factors influencing cost increases pertain to the availability of materials and labor and higher prices for them. They include seasonal productivity and geographic effects involving travelling and subsistence allowances for tradesmen and expensive conveyance of materials. Abnormal site conditions and observance of revised building codes have an impact. Specifications for flexibility, open areas, air conditioning, esthetic finishes, and sophisticated equipment are significant.

Changed design and use of standardized material as well as new items has offset some of the effects. Reduction of specifications has occurred in some provinces to reach conformity with ceiling amounts of support.

Results in most provinces witnessed the increase of figures for approved costs in some, or of ceiling amounts for support in others. This is in keeping with the periodic analysis basic to any revisions of assistance. Prices have not increased as rapidly as expected in a few areas, such as Alberta, where the ceiling support was not revised. However, specifications for some schools have been reduced. Current assertions that further reductions would lessen the quality of basic elements probably warrants some in-depth study of the features

and prices for recently tendered schools as well as the specifications for proposed ones.

Innovations have included systems building, open area concepts, many technological items and other features about design and new materials. Reports indicate that to implement open systems approach with use of some selected sub-systems and standardized modular components to establish flexibility in new design did not achieve expected economies. Some regional conclusions were that total costs need to be known before commencement of construction and that possible advantages should be further explored previous to any formal adoption of the principle. More caution pertained to the limited number of sub-systems used, the changing of dimensions of components, the volume of need, and the possible revision of pre-tendered prices on materials when they were to be delivered. Others thought benefits might arise from using modular components standardized from available materials which might provide for more bulk purchasing.

In the quest for flexibility, open area has been a widely accepted innovation, particularly in elementary schools. Arguments abound concerning the provisions for flexibility, and different instructional procedures. Many assert that the rapidity of change dictates that the use of buildings is not static, although some say that moveable walls may not be the answer to current demands and may not provide acceptable relationships between instructional areas and equipment needed for effective functioning of the facility. Reference is made to the prevailing opinion that the value of open area depends on the attitude of staffs and their ability to achieve the educational purposes intended. Opinion is also evident throughout the country that in school design open class area should not exceed the equivalent space of about four classrooms and that all schools should have some smaller enclosed spaces or conventional classrooms. Numerous appraisal studies may influence future decisions.

Comments about project management did not indicate significant advantages unless there can be increased team preplanning and coordination of many more sub-systems of standardized components. Statements about high-rise multi-use buildings pertained to educational effects, playground needs, and availability of land and did not favor recommendation for their use. The references to computerized information and new production in structural elements, mechanical equipment, and functional furniture indicated the importance of an interdisplinary study by all involved in material production, programs, design, and construction. Attention

is given to the benefit of creativity in architectural design and the importance of informing the architect about desired facilities and budget figures. Emphasis is also directed to the significance of design-research and expressed opinion that the Department might assume a leadership role in some extensive research concerning the nature of materials, developments in educational specifications, and changing design concepts. An interrelated study might culminate in some pattern book of standard specifications that indicate new architectural and program design.

OBSERVATIONS AND RECOMMENDATIONS

The survey has prompted some final observations and recommendations as indicated in the succeeding comments.

1. All provinces have requested the provision of instructional facilities and have assumed a part of building costs and many have conclusively established a principle with jurisdictions having local sources of revenue.

   The definite enunciation of a cost-sharing principle might emphasize local incentives for economy.

2. Government support of capital costs necessarily requires that a province exercise control over the amount it contributes or over the extent of expenditures in which it shares. The demands for more extensive facilities and higher specifications emphasize the necessity of such control.

   The control of expenditures is most definite where the amount to be spent is established and less where, of the estimated costs, only some are acknowledged for sharing purposes. Control is still less effective where indirect controls set maximum amounts of support; it is even more lenient where there is no approval of specifications or final plans and many features may contribute to large costs beyond support amounts. The results promote requests for more financial aid.

3. The practice throughout the country of recognition of instructional facilities for a specified number of pupils apart from the additional recognition of auxiliary area constitutes a principle that should be maintained.

4. It is significant that curriculum personnel are involved concerning types of instructional facilities and that projects are approved through the Education Departments which usually have architectural services as well.

> This is formally acknowledged in Alberta where the Curriculum Branch is represented on the School Building Board and where other members of the Board have had experience in curriculum work and school inspection. It is considered advantageous to include a member from the Treasury Department and also an architect from the Public Works Department.

It is recommended that the School Buildings Board in Alberta continue its functions with the existing provisions for its composition.

5. The differentials in support provided in each province, except Alberta, according to conditions in various regions substantiate considerable favor for relating support to approved costs of projects.

> This is significant in some provinces where computed cost estimates of particular projects may not include expenses for items that are included in the approved cost for other projects. Payment for special facilities or for land may be examples.

Conditions differ also in Alberta but the varying prices for land do not warrant inclusion in the support allowances of purchase cost for sites; these should probably continue to be secured by local arrangements in accordance with provisions of The Planning Act.

6. The periodic examination of tender prices as well as detailed analysis of cost components and the extent of specifications is important and it is also significant that most Departments of Education retain architects or engineers to facilitate this.

(a) It is recommended that similar service be engaged in the Building Branch of the Alberta Department of Education to assist in a continuing cost analysis of various components and specifications of construction projects. Additionally, the service could appraise standards, provide technical information, and assess new proposals.

(b) Expanded cost analysis is recommended as an important basis in considering recommendations for revised support. Tender prices only are not enough.

7. Benefits derive in most provinces from the liaison among Departments for authorizing boards to borrow capital funds.

> In Alberta, a Local Authorities Board grants borrowing authority to school boards and County Councils to finance

various local capital projects and it also countersigns the debenture issues.

(a) It is suggested that, in Alberta, when excess costs may be involved some relevant statement should be sent from the Department of Education to the Local Authorities Board for its information in considering approval of requests to borrow funds for capital school projects.

(b) It is also recommended that the Building Branch should continue to allocate available debenture funds and prepare the necessary documents for their issue and for action by school authorities and the Municipal Financing Corporation and, if necessary, by the Local Authorities Board.

Concerning Alberta, further comments and recommendations follow.

8. Small capital expenditures approved for support might be financed from current revenue instead of borrowing and qualify for direct reimbursement.

Regulations now require that debt-servicing is only for debentures or short-term loans. The small amounts needed for some approved capital projects, particularly, for renovations or upgrading do not warrant the interest costs of borrowing; it appears that, upon evidence of expenditure, reimbursement might be by grant if approved by the School Buildings Board.

9. Any extensive revision of support for capital costs or a new method of financing might show regard for regional disparities and give varied support related to necessary costs and the courses of needed revenue.

This may imply discretionary power of the School Buildings Board, or a share of the approved costs, or a differentiated formula having regard for regions, assessments, or other special conditions.

Favor is expressed for establishing, for shareable support in selected areas, the necessary expenses of an approved project that would permit some flexibility and yet provide overall control of capital expenditure.

10. Extra costs should be justified or restrained.

Current terms of accountability or fiscal discipline have little meaning without implementation.

Approval of areas should be based on functional needs of the school. Extra area beyond that approved for school use should be unnecessary unless it provides, at local expense, a community facility that can be incorporated

more economically in the school building than in some other structure. Thus such area, though acknowledged, should not qualify for support or debenture funds. Construction costs in excess of support prices for approved area may be classified, firstly, as expenses for non-essential features in the designed plans, or secondly, as necessary because of locality or market conditions at tendering time. In the first instance specifications might be reduced to an approved level so that expenses may be in conformity with an approved cost or ceiling support, unless it is established that the current budget can sustain the expense as the cost should not likely be financed by debentures. Alberta does not now approve total costs or control features contributing to them. In the second category extra costs, because of increased prices for labor and materials, size of the project or addition, and regional conditions justify debenture issues and challenge concern that the ceiling support corresponds to the share of assistance the government intends. This implies some approval of the specifications and, possibly, equipment as well, for purposes of support.

Having regard for current policy and rising costs it appears some increase from six to eight percent might be warranted. Payment for furniture, equipment, and site development has come from the support amount or from local revenue.

II.(a) As the School Building Board has the statutory obligation for recommending the degree of assistance, it is suggested that it arrange for a study of the features and costs of recently contracted schools and the specifications of proposed ones to determine the cost/quality and a basis for revision of support either by a ceiling amount or by approval of shareable costs. Technical services would facilitate the cost analysis.

(b) It is further suggested that consideration be given to:

i. Withholding debenture issues for excess costs unless there has been approval or appropriate revision of specifications.

ii. Allowing from any increased revision of support a designated amount up to the first $1.00 a sq. ft. for evidenced expenditure for approved equipment, furniture, and site development items not included in the construction contract; this would be apart from any bonus clause as specified in current regulations.

iii. A differential in support according to some schedule of sizes.

The varying requirements for small buildings or additions prompts the proposal that support schedules might be developed according to the size and nature of each.

iv. A revised support for small additions up to 8000 sq. ft. if approved as necessary permanent construction. Such support might be up to $1.00 per sq. ft. of gross area if only classrooms and corridors are involved and a further 50 cents per sq. ft. of the net area of specialized facilities as designated by the School Buildings Board; such facilities might include laboratories, additional washrooms, mechanical rooms needing new furnaces, and space for Home Economics and Industrial Arts.

12. Establishment of an inventory of facilities or bank of specifications. This data should serve as a basis for securing maximum utilizations; it could be automatically recorded for ready retrieval. The information might promote recognition of space on the existing enrolments rather than on a projected enrolment basis.

13. The Building Branch and School Buildings Board might assume a greater leadership role in planning and design and in appraisal of results.

(a) It is suggested that a design-research study be initiated that would provide for structured interaction of various agencies involved including the construction industry and, if possible, the suppliers as well.

(b) It is suggested that the Advisory Committee on School Planning be expanded to include representation from the Construction Association as

well as the Supervisor of the Buildings Branch with a view to identifying and communicating research conclusions. This provision for varied competencies should serve to advantage for specific purposes.

An interdisciplinary survey might include study of flexibility and proposed techniques of construction relative to systems approach, modular components, assessment of materials, and bulk purchasing. The findings of professional and technical personnel should provide a valid base for promoting greater uniformity in design, materials, and more standardization of some components without loss of flexibility. The study could also identify methods for recording data and analysing the separate elements of specifications with regard to standardizations, durability, maintenance, and user requirements. Moreover, it might facilitate reassessment of space requirements for subject areas, mechanical services, and equipment.

Any study with wide participation should culminate in viewpoints to promote the most efficient production of facilities with much potentiality for flexibility and varied use.

14. The Building Handbook might be upgraded to ensure more effective planning and coordinated control of construction. As a Building Manual it might provide some pattern book of minimum standard specifications. Surveys and research studies suggested should facilitate this.

15. A concluding observation is that recent buildings across the country reflect regard for convenience, technology, and new learning procedures relative to large assembly areas and media centers, open space, and specialized facilities for particular subject areas in an environment conducive to desired personal growth. Forecasts envisage revolutionary change in educational needs. But until building design is clearer the direction is one of ensuring extensive adaptability and applying all possible alternatives such as relocatable units, leased space, and conveyance services.

The above observations may give significance to current policies and procedures, and to proposals for further developments. Undoubtedly, they may suggest other